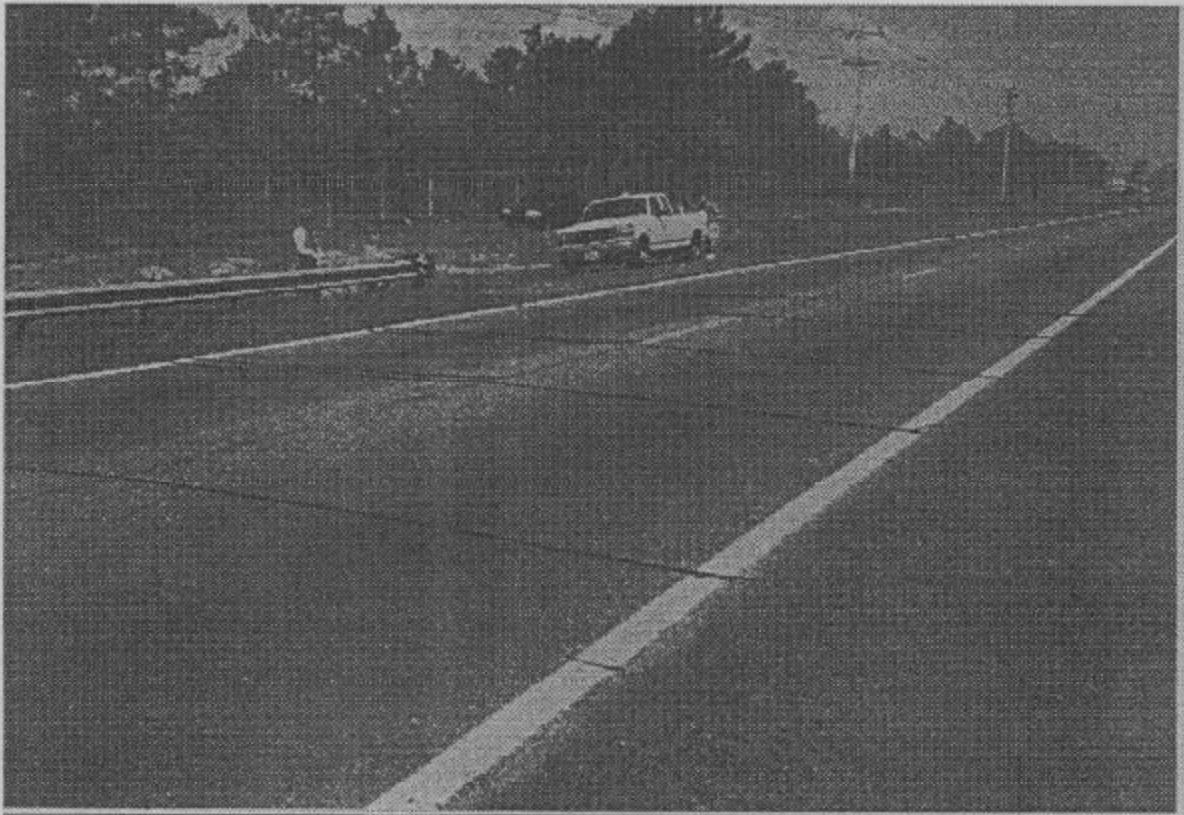


***Standardization of Count and
Classification Equipment Set-Up
and Configuration Process***

Final Report



prepared by:

***Farradyne
Systems, Inc.***

prepared for:

***Florida
Department of
Transportation***

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FINAL REPORT

(Version 2.1)

Prepared For:

Florida Department of Transportation

Prepared By:

FARRADYNE SYSTEMS, INC.

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June 29 1995

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1. FDOT Count & Classification Standardization Report

1.1 INTRODUCTION

Traffic data are the foundation of highway transportation operations and planning. This information is used in the decision process for most of the activities associated with transportation. The best decisions are always based on good, sound information. Improved data and data access can lead to better decisions and designs.

The Florida Department of Transportation has developed a mechanism to automate the data management of traffic count and classification information collected with portable units. This automation requires that data be collected by the field units in a uniform, standardized format. This report will outline the procedures and develop a step-by-step guide which will enable the various types of field equipment to be configured for direct inclusion into the data management system.

A survey of the local districts revealed that there were several types of portable traffic count/classification equipment currently being used. These devices include:

- Streeter Amet (PEEK) Models 241 and EZ
- Streeter Amet (PEEK) Model 141 with Datarecorder 240
- Mitron MSC 3000
- Diamond Models Tally 2001 and Phoenix

Other Vendors were contacted to obtain their output formats for inclusion into the data management system. These vendor included Golden Rivers and Jamar. Both vendors were concerned about the proprietary nature of their software and were not willing to participate in this project.

This report was developed with the understanding that the user has experience or training in the actual field setup of the equipment. There will not be any discussion of where or how to place road tubes, where and how to connect the tubes and loops to the counters, nailing procedures, or securing of equipment. The focus will be placed on the steps required to configure the individual counting devices to provide uniform, consistent output files.

1.2 TYPE OF COUNT

The data management system is designed to accommodate two basic types of vehicle data collection by the portable units:

- Vehicle count
- Vehicle classification

1.2.1 Vehicle counts

Vehicle counts represent a collection of information pertaining to the total number of vehicles which pass a particular point. The portable units collect axle or vehicle counts. Axle counts are actuations of the data collection device. The device normally counts two actuations (or two axles) as one count unit (or vehicle). Under this operation, a vehicle having more than two axles would register as more than one unit. A factor is typically applied to these values to adjust them to represent a vehicle count.

Vehicle counts use a more sophisticated detection scheme to determine the number of vehicles which pass a particular location. The detection scheme can range from inductive loops to road tubes placed in a specific configuration. The data management system must know what type of count data is being collected in order to determine which adjustment factors need to be applied to the raw field data.

1.2.2 Classification Counts

Classification counts collect information on vehicle types which pass a particular point on the roadway. The purpose of classification counting is to determine the vehicle mix of the traffic stream for axle conversion factors, pavement design, and planning purposes. Counters will typically segregate traffic into the 13 categories used by the Federal Highway Administration (FHWA). Appendix A shows the 13 classifications. A description of the classifications is summarized in the Appendix.

1.2.3 Data Context

Traffic measurements should be screened for machine malfunctions and their relative context to other counts and for reasonableness. Values should be compared to the historical data for the same location, and traffic points along the same roadway for spatial relationships. This should be done by an experienced, area knowledgeable professional, to identify defective counts or locations where additional analysis and examination may be required. Reasonability testing is to be conducted at the district level prior to submitting the data to the central office for inclusion into the data base management system.

2. SITE IDENTIFICATION CODE

A system has been developed to provide each count with a descriptive code. The code has been established to provide the summary software with information about the count for data processing purposes. Adherence to the identification code scheme described below is essential to the successful processing of the data.

2.1 COUNTER NUMBERING SCHEMES

General Information and Requirements

The coding scheme requires the use of a 10-digit code¹. The first two digits represent the unique county code established by FDOT. The next four digits represent the unique location (station) code which is also established by FDOT. The seventh digit in the sequence represents the direction code. The direction describes the travel direction of traffic (as defined in the FDOT station inventory) on the lane immediately adjacent to the counter. The definitions of the last three digits depend on whether a vehicle classification or vehicle volume count is being taken.

(a) For Vehicle Classification Counts: The eighth digit represents the total number of lanes being classified by the data collection unit. The ninth digit is the total number of lanes being classified in the direction described by the seventh digit. The tenth digit is the lane number of the first lane being classified by the data collection unit.

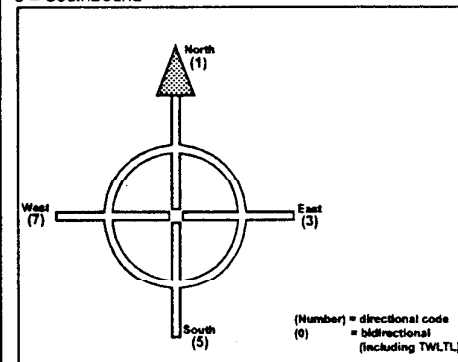
(b) For Vehicle Volume Counts: The eighth digit represents the total number of channels connected² to the data collection unit. The ninth digit is the total number of channels connected in the direction described by the seventh digit. The tenth digit is the lane number of the first lane being counted by the data collection unit.

10-digit Code (xx xxxx xxxx)

X1	2 digit County Code
X2	
X3	4 digit Station Code
X4	
X5	
X6	
X7	Direction (from the station inventory) for which the first volume or classification is recorded.
X8	Total number of (lanes Classified) or (channels - for volume counts).
X9	(Number of lanes Classified in the direction of X7) or (number of channels connected for volume counts in direction X7). Exception: When counting discretely a TWLTL and one or more other lanes, the value will be nine (9) to show that a TWLTL is involved. (See notes on next page.)
X10	Lane number fed into channel #1. Exception: X10 will be nine (9) when a TWLTL is discretely counted and channel(s) for volumes in only one other direction are also connected to the data collection unit.

Direction Code (X7)

1 = Northbound	7 = Westbound
3 = Eastbound	0 = Bi-directional count
5 = Southbound	



The Florida Department of Transportation uses the main compass directions only. This means the numbers 1, 3, 5, 7 will be used in the designation within the 10 digit code for a particular traffic count.

¹ Two additional zeroes must be added after the 10-digit code when setting up the Mitron msc-3000 counters.
² The number of channels connected to a data collection unit assumes that "double-tubing" is not being done.

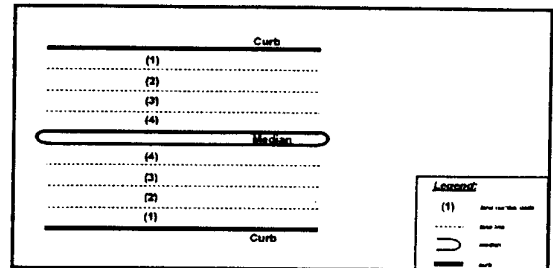
Lane Code (X10):

1 = Lane next to curb

:
:
:

n = Lane next to median (8 is maximum)

9 = Indicator for "Two Way Left Turn Lane" (TWLTL)



NOTES:

(1) If two directions are counted using only two channels of a single counter, then the lane number for each direction must be the same.

(2) If two directions are counted using three or more channels on a single counter, all lanes for the road in the second direction must be connected to that counter.

(3) If a single counter counts all the lanes in one direction plus a TWLTL, the TWLTL must be counted by the last channel used. The configuration coding will be:

X7	x	x = direction code
X8	y	y = total number of channels connected to counter
X9	9	
X10	9	

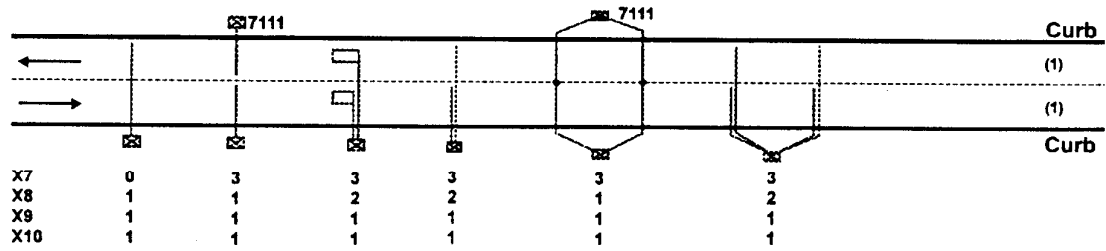
(4) If a single counter is connected to both directions plus a TWLTL, all lanes for the road must be connected and lane one of the first direction must be connected to the #1 channel. The configuration code will be:

X7	x	x = direction code
X8	y	y = total number of channels connected to counter
X9	9	
X10	1	

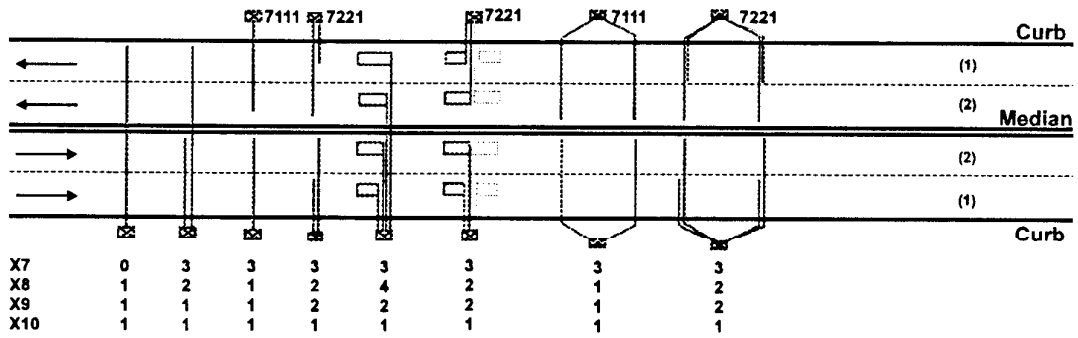
2.2 EXAMPLE IDENTIFICATION CODING SCHEMES

The following graphics will illustrate a wide range of possible traffic count and classification arrangements. They will also provide the corresponding last four digits of the identification code that would apply to each example.

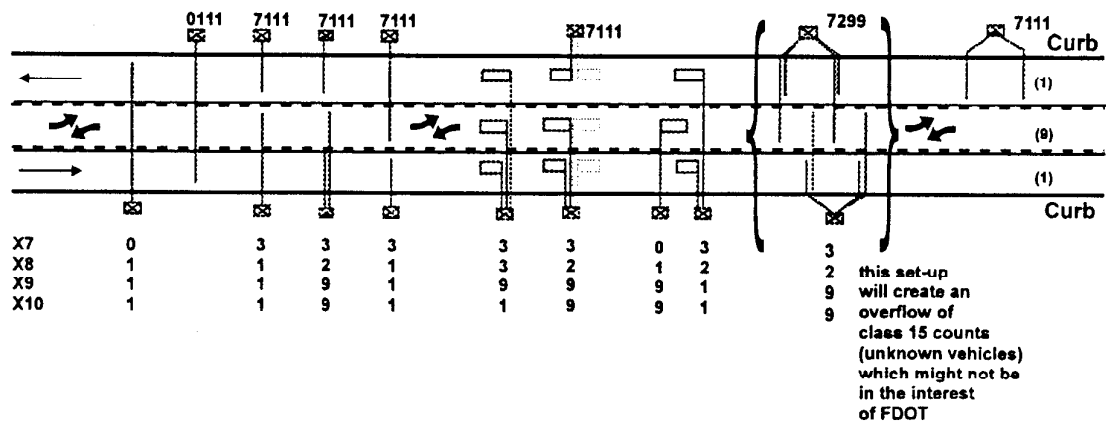
2.2.1 Example: Two Lane Undivided Highway



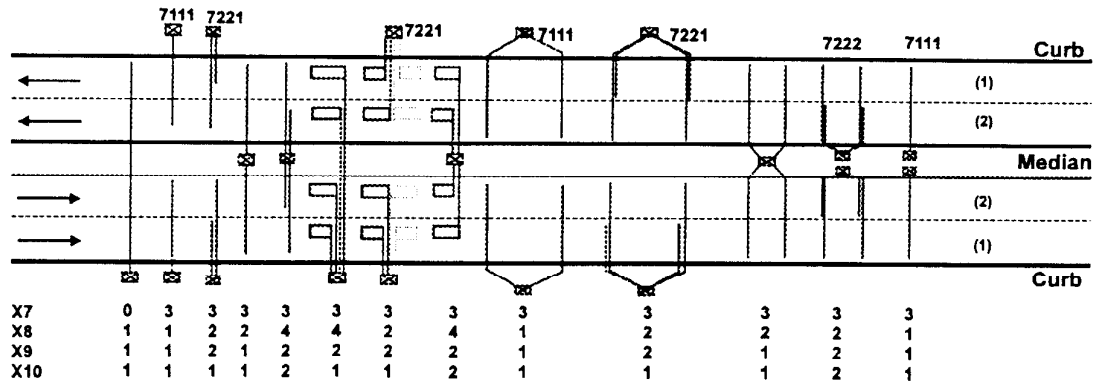
2.2.2 Example: Four Lane Undivided Highway



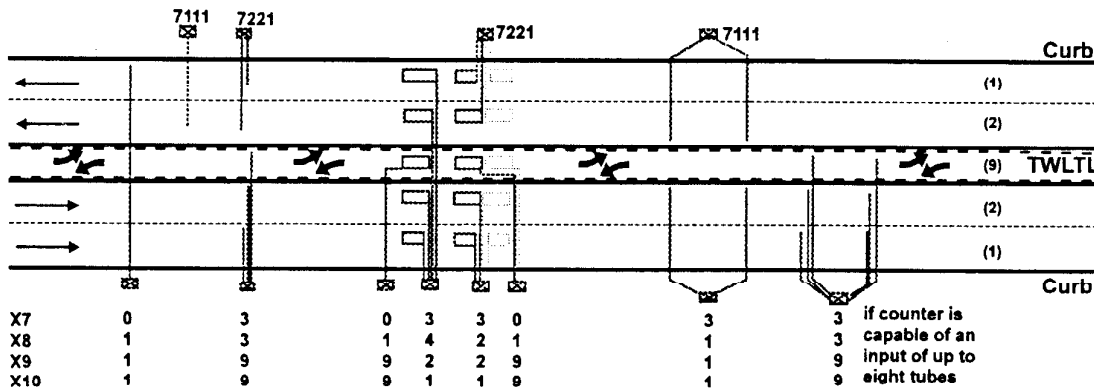
2.2.3 Example: Two Lane Undivided Highway with a Continuous Two Way Left Turn Lane



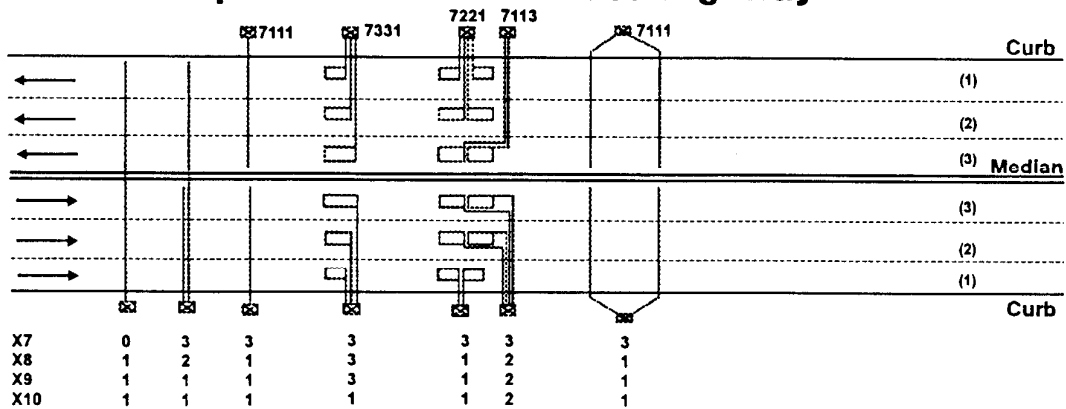
2.2.4 Example: Four Lane Divided Highway



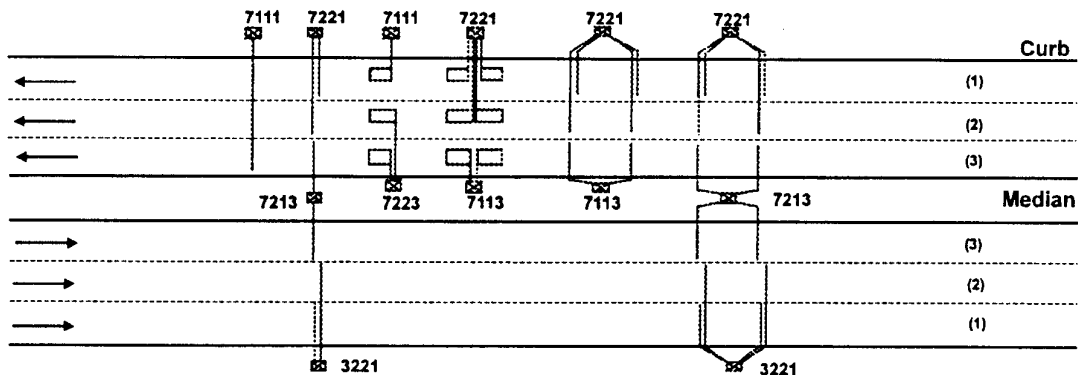
2.2.5 Example: Four Lane Undivided Highway with a Continuous Two Way Left Turn Lane



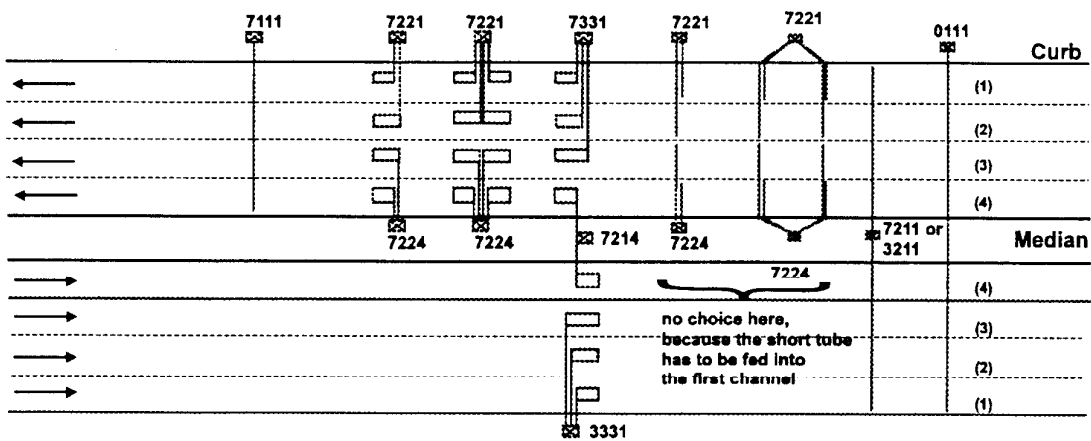
2.2.6 Example: Six Lane Undivided Highway



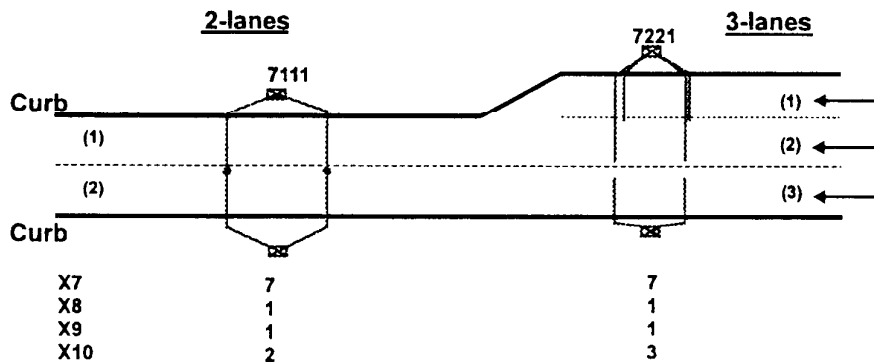
2.2.7 Example: Six Lane Divided Highway



2.2.8 Example: Eight Lane Divided Highway



2.2.9 Example: One Way Streets



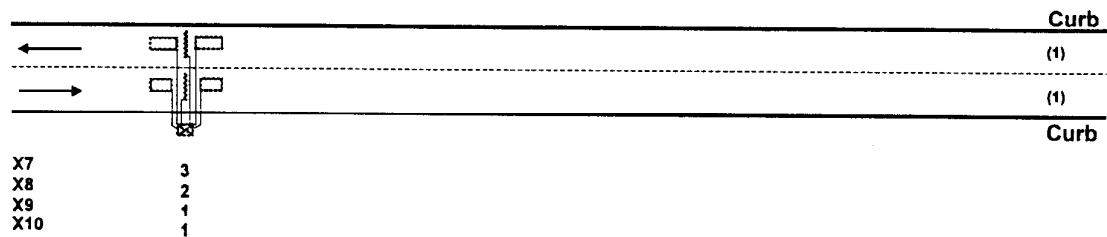
2.3 IDENTIFICATION CODING SCHEME (Loop-Piezo-Loop)

The following description is the coding scheme used for integrating additional configurations, particularly to classify vehicles for 4 lanes within one counter. This is in response to the fact that some districts in Florida established in-pavement sensors with the following configuration:

- Loop - Piezo - Loop

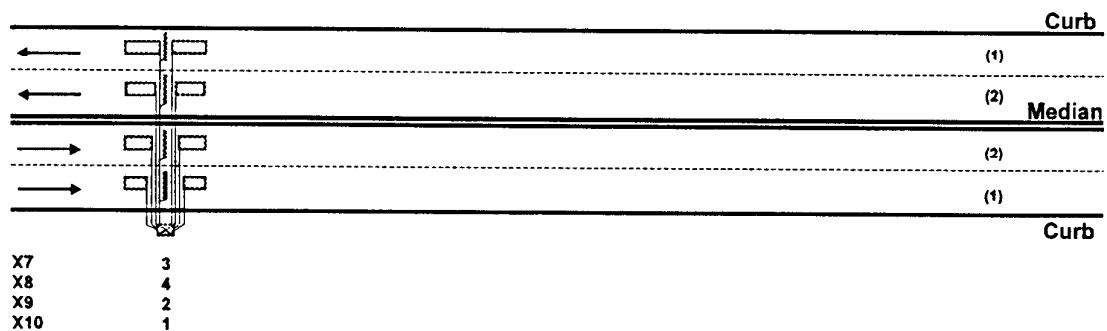
The following graphics illustrate the loop-piezo-loop classification arrangement for several different designs. They will also provide the corresponding last four digits of the identification code that would apply to each example.

2.3.1 Example: Two Lane Undivided Highway



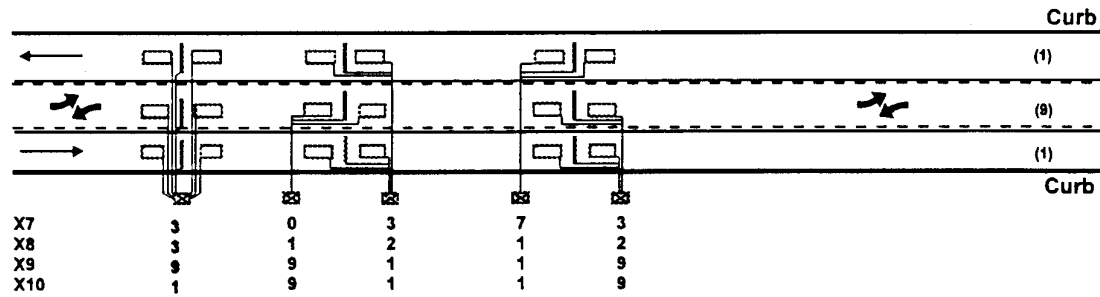
2.3.2 Example: Four Lane Undivided Highway

The coding scheme for four and eight lane divided highway, and undivided highway work the same way.

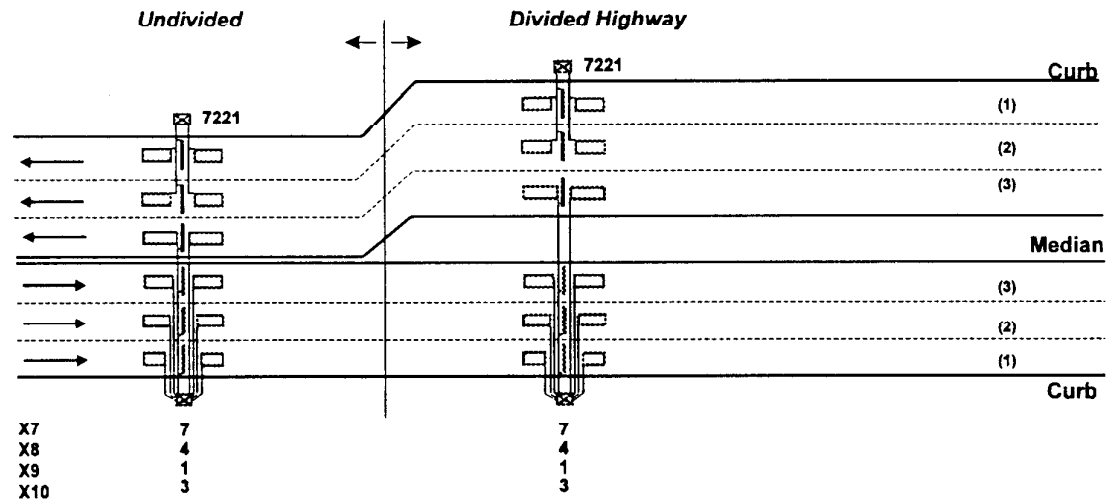


2.3.3 Example: Two Lane Undivided Highway with a Continuous Two Way Left Turn Lane

This set-up is similar to the set-up of the four lane undivided highway with a continuous TWLT Lane.



2.3.4 Example: Six Lane Highway



In this example, direction 7 is the "first" direction. See Note (2) in Section 2.1.

3. Equipment Specific Set-up

An inventory was conducted by the Florida Department of Transportation's staff to determine the types of traffic count equipment which are currently being used by the field personnel in their data collection effort. The results of the inventory will be used to develop a specific step-by-step configuration and setup guide for the equipment operators. The following sections will address the set-up procedures for each specific piece of equipment.

The standard configuration and setup format is important so as to allow the data to be readily transferred to the data base management system. Deviations from these procedures will result in manual data manipulation or recounts.

A series of summary sheets have been developed that reflect the set-up and configuration instructions listed below. These summary sheets can be found in **Appendix B**. The counter specific summary sheet may be placed in the lid of each counter to provide an easy reminder and quick reference on the set-up procedures to help ensure proper equipment operation. These are meant to be aides in assisting the field personnel in performing their daily tasks.

3.1 STREETER AMET

StreeterAmet is a vendor of traffic count equipment which has been purchased by Peek Traffic, Inc. The inventory of the count equipment used by the Florida Department of Transportation indicates that most of the counters currently in use are StreeterAmet models.

3.2 STREETER AMET MODEL 241 AND E-Z

This section describes the steps required to configure and set-up the StreeterAmet traffic counters to meet the Florida Department of Transportation's (FDOT) standards for collecting traffic data from portable traffic counters.

All of StreeterAmets' memories can be expanded through an insertable "data module". However, it is not necessary to have these data modules, because the data can be dumped directly out of the traffic counter into a computer.

The front panel of the StreeterAmet 241 and E-Z looks like the illustration shown in the figure on top of the next page.

<div style="border: 1px solid black; padding: 5px; text-align: center;"> 241C8B 23-AUG-94 15:25 </div>			
SETUP	VIEW	COPY	OUTPUT
	7	8	9
SET	DEC		INC
TEST		LOOP	
	4	5	6
B/S	◀		▶
CONFIG		CHECK	
	1	2	3
CLR	YES		NO
QUIT			ENTER
	▲	0	▼

3.2.1 Traffic Counter Configuration

The first step is to perform the configuration programming of the traffic counter. The configuration is the same for the volume or the classification counts. The following description is a step by step narrative on how to properly configure the counter for compatibility with the data summary software.

1. Press the ENTER button to turn on the traffic counter.
2. The following steps a) to n) do not have to be done in the field, if the counter has already been programmed in the office. If there is any doubt as to whether or not the counter is configured properly, please follow these steps and check the numbers.
 - a) Press the **CONFIG** button to configure the counter.
 - b) The first display asks for the date format: "USA DATE **Yes**". Press ENTER.
 - c) The next display asks for the current time in military format: "TIME **HH:MM**"
If the time is correct, just press ENTER. If the time is not correct, enter the correct time, and press ENTER.
 - d) The current date in the chosen format (see step a) should be entered next. If date is correct, press ENTER; if not, enter the current date and then press ENTER.

- e) The next display should show: "MODEM YES" (EZ) or "COMMS ON YES" (241). Change to **No** and press ENTER, when not connected to printer or modem (this usually does not happen in the field).

Note: If the above answer was YES, the following 6 Steps will be asked. If the answer was NO, the counter will jump to Step m.).

- f) The next display should show: "COMM.ID 1". Press ENTER.
- g) The next display should show: "BAUD 300". Change to **9600** using the left/right arrows and press ENTER.
- h) The next display should show: "7 BITS YES". Press ENTER (If NO is displayed, change to YES and then press ENTER).
- i) The next display should show: "PARITY YES". Press ENTER (If NO is displayed, change to YES and then press ENTER).
- j) The next display should show: "EVEN PARITY YES". Press ENTER (If NO is displayed, change to YES and then press ENTER).
- k) The next display should show: "1 STOP BIT YES". Press ENTER (If NO is displayed, change to YES and then press ENTER).
- l) The next display should show: "TYPE EPSON". Press ENTER (If OKI is displayed, change to EPSON using the Left/Right Arrows and then press ENTER).
- m) The next display should ask if the output should have Grand Totals, Midnight Totals, 24-Hour Totals, Hour Total, Interval Totals and/or Column Totals. Answer as follows:

Grand Total	YES
Midnight Total	NO
24-Hour Total	YES
Hour Total	YES
Interval Total	YES
Column Total	YES
- n) The next display should show the units for measurement. If **FEET & MPH** are displayed, then press ENTER; if not, use the Left/Right Arrows to change and then press ENTER.

3.2.2 Traffic Counter Set-Up for Volume Counts

To initiate the procedure to set-up the traffic counter for VOLUME COUNTS, press the SETUP button and follow these steps:

1. The Identification number must be manually entered for each count location. Even though the counter has the capability to accommodate 12 digits, all counts performed for the Florida Department of Transportation require that this number contain exactly 10 digits: the first two (2) are the country code, the next four (4) are the station number and the last four digits (4) are for the lane configuration code (**see Section 2**). Enter the 10 digit code and fill the remaining space with zeros (0). Hit ENTER TO CONFIRM.

SETUP	
ID	01 2345 6789

2. The next display should ask for the STATION NUMBER. Enter the agency or district specific STATION NUMBER, if one is required. Otherwise punch in Zero's(0) and press ENTER.
3. The display should now show: "INTERVAL 60". Press ENTER to select a 60 minute interval or punch in **15** to work with a 15 minute interval, then press ENTER.
4. When the following display appears: "PEAK INT. 1 NO", press ENTER. If PEAK INT. 1 YES" is displayed, change to NO and then press ENTER.
5. The next display should show: "NO. OF LANES". Punch in the number of lanes to be measured, (maximum of 8 for volume and maximum of 4 for classification and speed), and then press ENTER.

Only the Model 241 will display the following two displays:

6. The next display should show: "PIEZO No". Press ENTER (If YES is displayed, change to NO using the Left/Right Arrows and then press ENTER).
7. The next display should show: "Aux Contact I". The choices are I or ☐ (see next Step for explanation). Choose the appropriate one and confirm by pressing ENTER.
8. The next display should show the choices for LANE LAYOUTS, which are:
 - ☐ One axle sensor
 - ☐ One loop
 - ☐ ☐ Two axle sensor
 - ☐ ☐ Two axle sensors with loop in between
 - ☐ ☐ Two loops
 - ☐ ☐ Two loops with one axle sensor
 - ☐ ☐ One road tube across two lanes and one across one lane (short tube first)
9. For **Volume** counts choose the **"I" One Axle Sensor configuration** (or the **"☐"** **One Loop configuration**, or the **"☐ ☐"** **One Road Tube Across Two Lanes And One Across One Lane configuration**) by using the Left /Right arrows and then press ENTER.

10. The next display should show: "COLUMN LANE". Here the heading for the printout must be defined. For volume counts, always choose LANE. This selection is made by using the Left/Right Arrows and completed by pressing ENTER.

SETUP	Heading 1
Column	Lane

11. The next display should show: "SUMMATE No". Press ENTER. If YES is displayed, change to NO and then press ENTER.
12. The next display should show the "RATIO" factor. Change the value to TWO (2) for volume counts so that the counter will require two actuation to count one vehicle.

SETUP	
Ratio	2.00

13. The next display should show another HEADING. Choose **NONE** with the Left/Right Arrows and then press ENTER.
14. The next display should show "START NOW". Press **NO**, because the counter should not start to count immediately, and then press ENTER.
15. The next two displays should ask for the START TIME and START DATE of the Count. Type in the **TIME** first (in Military Time Format), and press ENTER, then type in the DATE (**MM:DD:YY** format) and press ENTER again.

SETUP	HH:MM
start	00: 00

SETUP	MM:DD:YY
start	08: 23: 94

16. The next display should show "NEVER END". Press **NO**, because the count must always have a defined End, followed by ENTER.
17. After the NO at the previous screen ("NEVER END"), the next two displays should ask for the END TIME and END DATE of the Count. Type in the **TIME** first (in Military Time Format), and press ENTER, then the **DATE** (**MM:DD:YY**-format) and press ENTER again.

18. The following display is the last one in the SET-UP. Change the NO-answer to a YES and press ENTER.

SETUP	
Armed	YES

19. To verify the accuracy of the counter's operation, change to the VIEW-mode (press VIEW) and watch vehicles passing the sensor(s).

After completion of these 19 steps, the counter is prepared for volume counts and it will start and end the count at the previously specified times.

3.2.3 Traffic Counter Set-Up for Classification Counts

To initiate the procedure to set-up the traffic counter for CLASSIFICATION COUNTS, press the SETUP button and follow these steps:

1. The Identification number must be manually entered for each count location. Even though the counter has the capability to accommodate 12 digits, all counts performed for the Florida Department of Transportation require that this number contain exactly 10 digits: the first two (2) are the country code, the next four (4) are the station number and the last four digits (4) are for the lane configuration code (**see Section 2**). Enter the 10 digit code and fill the remaining space with zeros (0). Hit ENTER TO CONFIRM.

SETUP	
ID	01 2345 6789

2. The next display should ask for the STATION NUMBER. Enter the agency or district specific STATION NUMBER, if one is required. Otherwise punch in Zero's(0) and press ENTER.
3. The display should now show: "INTERVAL 60". Press ENTER to select a 60 minute interval or punch in **15** to work with a 15 minute interval, then press ENTER.
4. The next display should show: "PEAK INT. 1 NO". Press ENTER. If PEAK INT. 1 YES" is displayed, change to NO and then press ENTER.
5. The next display should show: "NO. OF LANES". Punch in the number of lanes to be measured, (maximum of 8 for volume and maximum of 4 for classification and speed).

Only the Model 241 will display the following two displays:

6. The next display will only appear when a piezo-board is plugged into the counter. Press ENTER to select "PIEZO **No**". Select "PIEZO **YES**" BY USING THE LEFT/RIGHT ARROWS and then press ENTER TO CONFIRM (WHEN USING ANY COMBINATION WITH PIEZO SENSORS FOR CLASSIFICATION COUNTS).
7. The next display should show: "Aux Contact I". The choices are I or ☐ (see next Step for explanation), choose the appropriate one and confirm by pressing ENTER.
8. The next display should show the choices for LANE LAYOUTS, which are::
 - I One axle sensor
 - ☐ One loop
 - I I Two axle sensor
 - I ☐ I Two axle sensors with loop in between
 - ☐ ☐ Two loops
 - ☐ I ☐ Two loops with one axle sensor
 - I I One road tube across two lanes and one across one lane (short tube first)
9. For **Classification** counts choose the appropriate selection. Most of the times this will be the "I I" **Two Axle Sensor configuration** , if road tubes are being used. *When using existing loops (two per lane) it is necessary to add another road tube to do a Classification Count and the configuration for this setup will be the "☐ I ☐ " **Two Loops With One Axle Sensor configuration**.*
10. The next screen will only be displayed when the above choice was the "I I" **Two Axle Sensor configuration**: "SAME LN DIR NO", Answer **YES**, if traffic flow is same direction. If traffic flow is in opposite directions, answer NO. Then press ENTER.
11. The following display is also only displayed when the chosen configuration was the "I I" **Two Axle Sensor configuration**:

SETUP	
4 Rt in Lane	NO

12. Press ENTER, when **NO** is displayed, otherwise change to NO, and then press ENTER. (YES is only used when there are four tubes in one of the lanes for the Four Road Tube, Two Lane Count Program).
13. The next display should show: "COLUMN LANE". Here the heading for the printout must be defined. For Classification-counts, it must always be **TYPE**. The selection is made through the Left/Right Arrows and completed by pressing ENTER.

SETUP Heading 1	
Column	Type

14. The next display should show: "SUMMATE **NO**". Press ENTER. If YES is displayed, change to NO and then press ENTER.
15. The next display should be for another HEADING. IF LOOPS AND PIEZOS ARE CONNECTED CHOOSE **LANE** FOR HEADING WITH Left/Right Arrows. OTHERWISE, choose **NONE** with Left/Right Arrows and then press ENTER.
16. The next display should show "START NOW". Press **NO**, because the counter should not start to count immediately, followed by ENTER.
17. The next two displays should ask for the START TIME and START DATE of the Count. Type in the **TIME** first (in Military Time Format), and press ENTER, then type in the **DATE** (MM:DD:YY-format) and press ENTER again.

SETUP	HH:MM
start	00: 00

SETUP	MM:DD:YY
start	08: 23: 94

18. The next display should show "NEVER END". Press **NO**, because the count should always have a defined End, followed by ENTER.
19. The next two displays should ask for the END TIME and END DATE of the Count. Type in the **TIME** first (in Military Time Format), and press ENTER, then type in the **DATE** (MM:DD:YY-format) and press ENTER again.
20. The following display should be the last one in the SET-UP. Change the NO-answer to a **YES** and press ENTER.

SETUP	
Armed	YES

21. After the traffic counter is ARMED, press the **VIEW** button to change to the VIEW-mode. In the VIEW-mode select the lane in which SENSOR DISTANCE or LOOP LENGTH has to be changed by using the UP/DOWN ARROWS.
22. When in the VIEW-mode, press the **TEST** button to change the SENSOR DISTANCE and LOOP LENGTH.
23. The first display should show the SENSOR DISTANCE. Change to the distance value which represents the detector field spacing: if its a 10 foot distance between the sensors, punch in "**10**" and then press ENTER.

24. To change this for other lanes, select the lane in the **VIEW** mode and repeat STEPS 22 and 23.
25. To verify the accuracy of the counter, stay in the **VIEW** mode and watch vehicles passing the sensors. If the classification of the passing vehicles is incorrect, review the set-up and sensor spacing inputs first.

After completion of these 25 steps, the counter is prepared for classification counts and it will start and end to count at the specified times.

3.3 STREETER AMET MODEL 141 PLUS 240

(Model 141 [Field Recorder] plus the 240 Data Collector)

This section describes the steps that are required to configure and set-up the StreeterAmet traffic counter to meet the Florida Department of Transportation (FDOT) standards for collecting traffic data from portable traffic counters.

The **Model 141** StreeterAmet traffic counter is the oldest and the only StreeterAmet which is accompanied by a data-collector unit (the Model 240). All StreeterAmet memories can be expanded through an insertable "data module". However, it is not necessary to have these "data modules", because the data is dumped directly out of the traffic counter.

The programming for the set-up and configuration of the counter is done by using the data collector. The display of the data collector is shown below. The field recorder and the data collector must be connected prior to the configuration and set-up.

<div> <div>Model 240 X.XX</div> <div>23-AUG-94 15:25</div> </div>						
PROGRAM	SET UP	OUTPUT	A	7 YES	8	9 NO
VIEW	▲	COLLECT	B	4 -	5	6
◀	CHECK	▶	C	1	2	3
QUIT OFF	▼	CONFIG. TEST	D	CLEAR ON	0	ENTER

3.3.1 Traffic Counter Configuration

This first section is for the set-up and configuration of the traffic counter. The configuration is the same for the volume and the classification counts. A field recorder unit must be connected to the data collector, then the configuration process can begin.

1. Press ENTER button to turn on the traffic counter.
2. The following steps a) to k) do not have to be done in the field, if the counter has been (pre-programmed) in the office. If there is any doubt as to whether or not the counter is configured properly, please follow these steps and check the numbers.
 - a) Press the CONFIG/TEST button to configure the recorder.
 - b) Change the underbar from NO to **YES** by using the LEFT ARROW or by pressing the YES/7-button.
 - c) The next five (5) displays request input for the **MINUTE, HOUR, DAY, MONTH** and **YEAR**. If these are correct, skip this step by using either ENTER or the DOWN-ARROW. If one or all of them have to be changed, key the correct value in and press ENTER after each change.
 - d) The next display should show: "BAUD 300". Change this to **9600** by using the left/right arrows and press ENTER.
 - e) The next display should show: "7 BITS **YES**". Press ENTER (If NO is displayed, change to YES and then press ENTER).
 - f) The next display should show: "PARITY **YES**". Press ENTER (If NO is displayed, change to YES and then press ENTER).
 - g) The next display should show: "EVEN PARITY **YES**". Press ENTER (If NO is displayed, change to YES and then press ENTER).
 - h) The next display should show: "1 STOP BIT **YES**", press ENTER (If NO is displayed, change to YES and hit ENTER after doing so)
 - i) The next display should show: "COLLECT AUTO.; CLEAR YES NO". Change to **No** using the RIGHT ARROW or the NO/9-button and press ENTER.

COLLECT Auto.

Clear Yes No

- j) The next display should ask for the output format. For this set-up, enter "11" (eleven)" and press ENTER.

11 = Hourly, 24-hour and grand totals

- k) The last display should show: "CONFIG; ERASE DATA YES NO" and the NO has an underbar. Press left arrow key to move the underbar to the YES position and press ENTER.

3.3.2 Traffic Counter Set-Up for Volume Counts

3.3.2.1 Fast Setup by using the Special Function Keys

If the SETUP CONFIGURATION FOR VOLUME COUNTS is already saved under the SPECIAL FUNCTION KEY A, pressing the A-button will immediately load the setup. The only items that need to be changed are the STATION NUMBER and the ID NUMBER, and also make sure that the question "CLEAR 141 DATA" is being answered with YES, because a new program is being loaded.

3.3.2.2 Normal Setup

To initiate the procedure to set-up the traffic counter for VOLUME COUNTS, press the PROGRAM button, and use the following steps:

1. If the display shows: "**PROGRAM 141; VOLUME __**", then press ENTER. If a different program is displayed, use the UP AND DOWN ARROWS to change to the VOLUME program and press ENTER then.
2. The next display will be a waiting period, and it should show: "Program 141; 1213 __" It will countdown to ZERO (0) which will take approximately 2 minutes. After the countdown, the display should change to:

PROGRAM 141

Ok

3. After a few more seconds, the display should change back to the very first display of the Data Collector.
4. Press the SETUP button to activate a display that shows: "VOLUME; BUSY __". The display should change to:

Volume

Station 0_

5. This display asks for the STATION NUMBER. Enter the agency specific STATION NUMBER, if one is required, otherwise punch in Zero's (0) and press ENTER.
6. The Identification number must be manually entered for each count location.. Even though the counter has the capability to accommodate 16 digits, all counts

performed for the Florida Department of Transportation require that this number contain exactly 10 digits: the first two (2) are the district code, the next four (4) are the station number and the last four digits (4) are for the lane configuration code (**see Section 2**). Enter the 10 digit code and fill the remaining space with zeros (0). Hit ENTER TO CONFIRM.

7. Display should now show: "VOLUME; INTERVAL 60". Press ENTER to select a 60 minute interval or punch in **15** to work with a 15 minute interval, then press ENTER.
8. The next display should show: "VOLUME; LOOPS YES NO" with an UNDERBAR under the NO. Press ENTER, if Tubes are being used. (If Loops are being used, change to YES using the LEFT ARROW or the YES/7-button and press ENTER. If the UNDERBAR is under the YES and tubes are used, change to NO using the RIGHT ARROW or the NO/9-button and press ENTER after doing so).

Volume		
Loops	Yes	<u>No</u>

9. The following display appears next: "INP. PER CHAN. ____". Press **1 (one)** first and then ENTER. This indicates the number of sensors to be summed into each channel (each channel is equal to a column in the printout).
10. The next display should be: "NO. OF LANES". Punch in the number of lanes to be measured (a *maximum of 8 for volume with tubes and 4 when using loops*) and press ENTER.
11. The next display should show: "SAVE SETUP YES NO". If this setup should be used for another station, change the UNDERBAR from NO to **YES** by using LEFT ARROW and press ENTER afterwards; otherwise, press ENTER for NO.
12. This setup then has to be assigned to one of the SPECIAL FUNCTION KEYS A, B, C or D. Press the **A-button** to save the Volume count setup as A.

Save Setup	
Assign:	<u>A</u> B C D

13. The following display shows: "SAVE SETUP; BUSY ____".
14. The last display in the SETUP shows: "CLEAR 141 DATA; YES NO" with an UNDERBAR under the **YES**. Press ENTER to confirm.

Clear 141 Data	
<u>Yes</u>	No

15. To control the accuracy of the counter, change to the VIEW-mode (press **VIEW**) and watch vehicles passing the sensor(s).

16. To exit the VIEW-mode, press **QUIT**.

After completion of these 16 steps, the counter is prepared for volume counts, but it will start to count immediately and the count ends whenever the traffic counter is being picked up.

3.3.3 Traffic Counter Set-Up for Classification Counts

3.3.3.1 Fast Setup by using the Special Function Keys

If the SETUP CONFIGURATION FOR VEHICLE TYPE OR CLASSIFICATION COUNTS is already saved under the SPECIAL FUNCTION KEY **B**, pressing this B-button will immediately load the setup. The only items that need to be changed are the STATION NUMBER and the ID NUMBER, and also make sure that the question "CLEAR 141 DATA" is being answered with **YES**, because a new program is being loaded.

3.3.3.2 Normal Setup

To initiate the procedure to set-up the traffic counter for CLASSIFICATION COUNTS, press the **PROGRAM** button.

1. If the following display shows: "PROGRAM 141; VEHICLE TYPE __", press ENTER. If a different program is displayed, use the UP AND DOWN ARROWS to change to the **VEHICLE TYPE** program and press ENTER then.
2. The next display is a waiting period and shows: "Program 141; 2141 __" and it will countdown to Zero (0) which will take approximately 2 minutes. After that the display will change to:

PROGRAM 141
Ok

3. After a few seconds the display will change back to the very first display of the Data Collector.
4. After pressing the SETUP button, the display shows: "VEHICLE TYPE; BUSY __". The display will change to:

Vehicle Type
Station 0

5. This display asks for the STATION NUMBER. Enter the agency specific STATION NUMBER, if appropriate. Otherwise punch in Zero's(0) and press ENTER
6. The Identification number must be manually entered for each count location.. Even though the counter has the capability to accommodate 12 digits, all counts performed for the Florida Department of Transportation require that this number contain exactly 10 digits: the first two (2) are the district code, the next four (4) are the station number and the last four digits (4) are for the lane configuration code (**see Section 2**). Then after the 10 digits are coded and displayed, hit ENTER
7. Display should now show: "VEHICLE TYPE; INTERVAL 60". Punch in **15** to work with a 15 minute interval, then press ENTER.
8. The next display should show: "SAVE SETUP YES NO". If this setup should be used for another station, change the UNDERBAR from NO to **Yes** by using LEFT ARROW and press ENTER afterwards.
9. This setup then has to be assigned to one of the SPECIAL FUNCTION KEYS A, B, C or D. Press the **B-button** to save the VEHICLE TYPE or CLASSIFICATION count setup as B.

Save Setup	
Assign:	A B C D

10. The following display shows: "SAVE SETUP; BUSY _".
11. The last display in the SETUP shows: "CLEAR 141 DATA; YES NO" with an UNDERBAR under the **Yes**. Press ENTER to confirm.

Clear 141 Data	
<u>Yes</u>	No

12. To control the accuracy of the counter, change to the VIEW-mode (press **VIEW**) and watch vehicles passing the sensor(s).
13. To exit the VIEW-mode, press **QUIT**.

After completion of these 13 steps, the counter is prepared for vehicle type or classification counts, but it will start to count immediately and the count ends whenever the traffic counter is being picked up.

3.4 MITRON MSC 3000

This section describes the steps required to configure and set-up the Mitron MSC 3000 traffic counter to meet the Florida Department of Transportation's (FDOT) standards for collecting traffic data from portable traffic counters.

The Mitron traffic counter is provided with a hand-held programming unit and uses insertable memory packs. The programming unit must be connected to set-up and configure the counter. The memory pack that must be empty and clear. If the memory pack is not clear/empty, the first display after pressing the TEST button will show either "USED" or "BAD", which means that the memory pack must be exchanged or cleared.

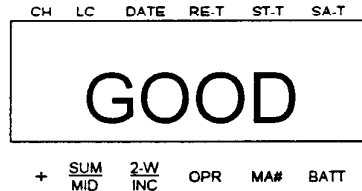
An illustration of the hand-held programming unit is provided below.

<div style="border: 1px solid black; height: 100px; margin: 10px;"></div>			
7	8	9	SUM
4	5	6	2 WAY
1	2	3	MONT
ENT	0	CAN	REC
AUX 1	AUX 2	TEST	SRCH

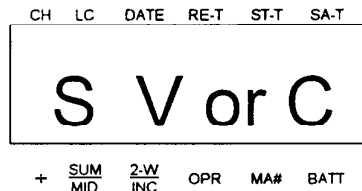
3.4.1 Vehicle Volume Count Configuration and Set-up

The count configuration follows a similar process to the classification section discussed above. First insert a memory pack in slot MP1 and connect the hand-held programming unit.

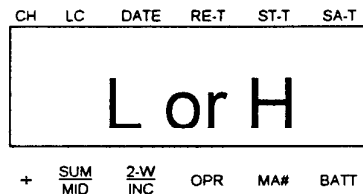
1. Press the **TEST** button. On the screen should be 6 dashes for about 20 seconds, then GOOD, which indicates that the memory test is passed. Then press the **TEST** button again.



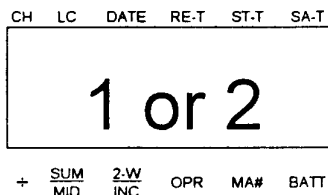
2. The display should show: "S" (speed), "V" (volume), "C" (classification).



3. Press "2" (2 = V = volume) and press ENTER.
4. Press the **TEST** button again.
5. The display should show: "L or H" (inductive Loop or pneumatic Hose)



6. Press "1" for Loops or press "2" for Hoses (Tubes), and press ENTER.
7. The next display should show: "1 or 2" (for Input Channel 1 or Input Channel 2)



8. Press "1" for Channel 1 or press "2" for Channel 2 and press ENTER.

9. The next screen should show "0", which is a FIELD TEST to view if the counter is working correctly. (For the pneumatic hose input, every second axle should be counted.)
10. Press CAN-Button to exit the FIELD TEST-mode.
11. The next display shows: "CH:1" (Channel 1), and then press ENTER.
12. Enter the 10 digit location code. Even though there is the possibility to punch in 12 digits, this number contains just 10 digits: the first two (2) are the county code, the next four (4) are the station number and the last four (4) digits are for the lane configuration code (see SECTION 2.1). After typing in the 10 digits, press ENTER

CH	LC	DATE	RE-T	ST-T	SA-T
000000					
+ SUM MID		2-W INC		OPR	MA# BATT

13. The display should show DATE now. Enter date in **MM/DD/YY** form (month-01=January, 02=February...12=December; day-01,02...31; year-94,95...99) and press ENTER.
14. The display should show RE-T (REal Time). Enter the current **TIME** in Military Format (for example: 15:29 for 3:29 PM) and press ENTER.
15. The display should show ST-T (Start Time). Enter the **HOURL** on which the count is supposed to start (**IMPORTANT**: must use Military Time format and whole hours only, e.g. = 14:00 or 15:00, but nothing in between).

CH	LC	DATE	RE-T	ST-T	SA-T
15:00					
+ SUM MID		2-W INC		OPR	MA# BATT

16. The display should show SA-T (SAmples Time interval): Enter the interval of **15** minutes (the range is from 1 minute to 60 minutes) in an hourly format (00:15) and press ENTER.

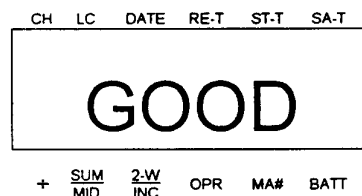
CH	LC	DATE	RE-T	ST-T	SA-T
00:15					
+ SUM MID		2-W INC		OPR	MA# BATT

17. The display should show the "÷"-symbol, which stands for the number of axles required to register one vehicle count.
18. Type "2" and press ENTER.
19. The display should show the "SUM / MID" symbol, which lets you choose if the inputs should be summarized in one memory pack (MP1). Press **ENTER**.
20. The display should then show the "2-W / INC" symbol, which lets you choose if the inputs are for opposite directions or not (two-way feature). Press ENTER to choose both lanes in the same direction, even if its not the case.
21. The display should show OPR (OPeRator). Punch in your two digit operator-code and press ENTER.
22. The display should show MA# (Machine-number). Punch in the number of the traffic counter and press ENTER.
23. Finally, a blank screen appears. Press the **REC** button to start the recording.
24. To monitor the traffic in real time and to test if the setup was successful, press the **MONT** button.
25. Press the **CAN** button to cancel the monitoring feature.

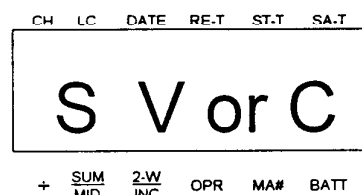
3.4.2 Vehicle Classification Count Configuration and Set-up

This section describes the configuration and set-up of the counter for a vehicle classification count. The memory pack should be inserted in slot MP1, and the hand-held programming unit should be connected. Once the initial hardware set-up has been completed, the following steps must be completed:

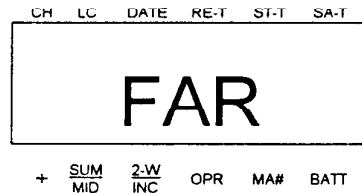
1. Press the **TEST** button. On the screen should be 6 dashes for about 20 seconds, then GOOD, which indicates that the memory has passed its internal testing procedures. Then hit the **TEST** button again.



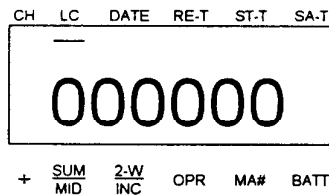
2. The display should show: "S" (speed), "V" (volume), "C" (classification)



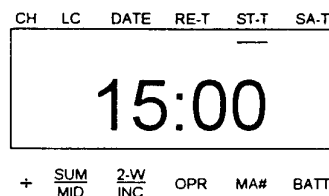
3. Press "3" (3= C = classification) and press ENTER
4. Press the **TEST** button again
5. The display should show FAR, which is asking how far apart the tubes are in centimeters (10 ft = 305 cm)



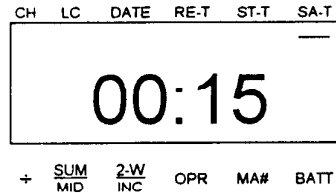
6. Type in the **distance** between the tubes (in CENTIMETERS, see **Appendix C** for conversion table) and then press ENTER
7. The next screen should show F:00, which is a FIELD TEST to view if the counter is working right. Press **CAN** (for cancel) and ENTER to skip this field test.
8. Enter the 10 digit Location Code. Even though there is the possibility to punch in 12 digits, this entry will contains just 10 digits: the first two (2) are the county code, the next four (4) are the station number and the last four (4) digits are for the lane configuration code (see *SECTION 2.1*). After typing in the 10 digits, press ENTER



9. The display should show DATE now. Enter **DATE** in **MM/DD/YY** format (month-01=January, 02=February...12=December; day-01,02...31; year-94,95...99) and press ENTER.
10. The display should show RE-T (REal Time). Enter the current **TIME** in Military Format (for example: 15:29 for 3:29 PM) and press ENTER.
11. The display should show ST-T (**Start Time**). Enter the **HOURL** on which the count is supposed to start (IMPORTANT: must use Military Time format and whole hours only, e.g. = 14:00 or 15:00, but nothing in between).



12. The display should show SA-T (SAMPLE Time interval): Enter the interval of 15 minutes (the range is from 1 minute to 60 minutes) in an hourly format (**00:15**) and press ENTER.



13. The display should show OPR (OPeRator). Punch in your two digit operator identification code (if required) and press ENTER.
14. The display should show MA# (Machine-number). Punch in the number of the traffic counter and press ENTER.
15. Finally, a blank screen appears. Press the **REC** button to start the recording.
16. To monitor the traffic in real time and to test if the setup was successful, press the MONT-button. Press **MONT** button again and the display shows the F-scheme (classification-scheme) for every vehicle crossing the tubes.
17. Press the **CAN** button to cancel the monitoring feature.

3.5 DIAMOND TRAFFIC PRODUCTS - TALLY 2001 and PHOENIX

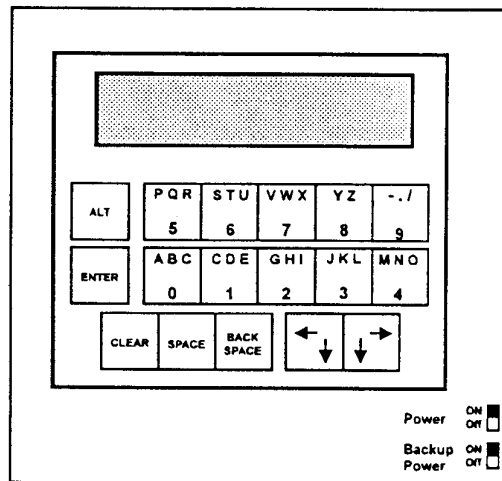
Tally 2001 (VERS 3.01) / Phoenix (VERS 1.61) - General Information

The inventory of the count equipment conducted by the Florida Department of Transportation indicates that the Diamond counter has been used in District 4 (Tally 2001). District 3 recently added a new Diamond counter model (the Phoenix) to their equipment inventory. Both of these counter types are very similar in their configuration and set-up for a volume and classification count.

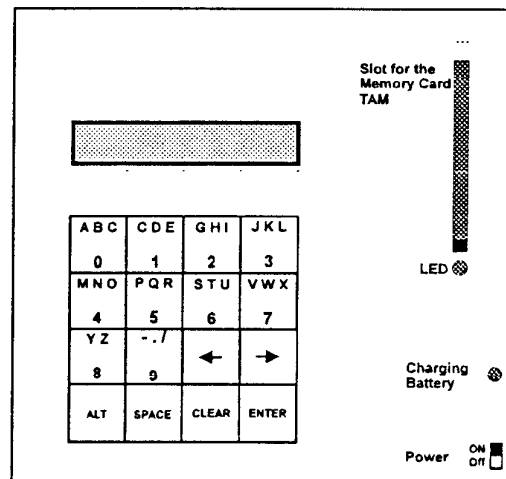
This section describes the steps required to configure and set-up the Diamond traffic counters (Tally 2001 and Phoenix models) to meet the Florida Department of Transportation's (FDOT) standards for collecting traffic data from portable traffic counter equipment. These configuration and set-up steps do not have to be performed in the field. If they are performed in the office, the operator is encourage to check the configuration and set-up before using the machine. The form of count (either volume or classification) has to be defined within the configuration of the Diamond counter.

The data is directly dumped from the traffic counter into a computer using the *TrafMan®* software which is supplied by the vendor. The FDOT software which has been developed will replace the *TrafMan®* software function.

The front panels of the Diamond Tally 2001 and the Diamond Phoenix traffic counters are illustrated below.



Diamond Tally 2001



Diamond Phoenix

A basic difference between the Diamond counters and the other models covered in this document (Streeter Amets and the Mitrons) is the ability to enter alpha numeric characters. To enter a letter, depress the "ALT" key and the button displaying the desired letter simultaneously. The first letter appearing is the first letter listed on that button. The second letter is retrievable by pressing the same button again while still pressing the "ALT" key.

Example: To type the letter D, hold down the "ALT" key while pressing 1. This will display the letter C. Then press the 1 button again while still holding the "ALT" key which will result in displaying of the letter D. To display the letter E, press the 1 button once again while depressing the "ALT" key during the entire sequence.

Another difference is the fact that some displays ask for a typed-in response, but it is not always obvious. As a rule, whenever a blinking rectangle appears on the screen, a typed-in response is required. All other times, the ARROW KEYS can be used to scroll through the choices. The response must then be confirmed by pressing ENTER.

3.5.1 Traffic Counter Configuration

The first step is to perform the configuration programming of the traffic counter. The configuration is the same for volume or classification counts. The following description is a step by step narrative on how to properly configure the counter for compatibility with the data summary software.

1. Switch the **POWER** button to turn on the traffic counter.
2. After the system self test, the display shows "**SELECT OPTION: Start Collection**". The choices available are:
 - 1.) Start Collecting
 - 2.) Delete Files
 - 3.) Show Files
 - 4.) Test Sensors
 - 5.) Time of Shutdown
 - 6.) Configure System
 - 7.) Cold Restart
3. The following steps a) to m) do not have to be done in the field if the counter has already been programmed in the office. If there is any doubt as to whether or not the counter is configured properly, please perform the following steps and verify the settings.
 - a) Choose "**6**" for "**Configure System**" to check if the configuration is set-up correctly.
 - b) Press the **ENTER** button to configure the counter.
 - c) The first display asks for the "**Select Storage Mode**". Use the **ARROW KEYS** to select the appropriate Mode and then press **ENTER**:

BINNED - for Classifications Counts
COUNT - for Volume Counts

- d) The format of the **DATE** has to be chosen in the second display of the configuration set-up: "Select Format Of Dates: MM/DD/YY". Confirm by pressing **ENTER** when "**MM/DD/YY**" is displayed. If something else is displayed, use the **ARROW KEYS** to scroll through the menu options until MM/DD/YY appears.
- e) The next display asks, if the first file should be overwritten with the newest file when the memory is full: "**Erase First File When No Mem?** No". Press **ENTER** to confirm the **NO**.
- f) The following display should show: "**Verify Power Off Option: Enabled**". Confirm by pressing **ENTER**. If the display shows "Verify Disabled" use the **ARROW KEYS** to change the display to show Enabled and then press **ENTER**.

Verify Power Off

Option: Disabled

- g) After "**Create New Files When: Daily**" is been displayed, the following choices are available. Choose **DAILY** and press **ENTER**.

Manually Creates a new file only when told by operator

Daily Creates a new file every day at midnight

Weekly Creates a new file once a week

- h) The next display should show: "**Maximum BAUD for Modem: 1200**". Change to **9600** using the ARROW KEYS and press **ENTER**.

If the Select Storage Mode was chosen to be *Count Mode for Volume Counts*, the next four questions are skipped.

- i) The "Speed and Length Format" has to be chosen in this next appearing display:

Speed and Length

Format? U.S.

- j) Press ENTER; if "**U.S.**" is displayed. Use the Arrow Buttons when "Metric" is shown to change to "U.S."
- k) The next display should show: "SnMis Storage Mode: **View Only**". Press Enter to view eventual sensor misses on-screen. This entry will not store them in memory.
- l) The next display should show: "Maximum Axle Spacing: 35.0' ". Punch in **350** and press ENTER, the counter will automatically add the dot.

The following display(s) are for all Storage Modes.

- m) The next display repeats the first display, which means that the configuration exercise for this count is done: "**SELECT OPTION: Configure System**". Use either the ARROW BUTTONS or punch-in "**1**" (**one**) to select "**Start Collecting**" which is the heading of the actual Set-up.

3.5.2 Traffic Counter Set-Up for Volume Counts

To initiate the procedure to set-up the traffic counter for VOLUME COUNTS, the operator must verify that the **STORAGE MODE is set to COUNT MODE** (this has to be done in the CONFIGURATION, see section 3.6.2). Upon verification, select **Start Collecting** by scrolling through the menu using the Arrow Buttons (or by pressing **1**) from the first display (discussed in item 2, section 3.6.2) after turning on the counter.

1. The site number (or **Identification number** as it is referred to by the counters from StreeterAmet or Mitron) must be manually enter for each count location. All counts performed for the Florida Department of Transportation require a number containing exactly **10 digits**: The first two (2) are the county code, the next four (4) are the station number, and the last four digits (4) are for the lane configuration code (**see Section 2**). Once the 10 digits are coded and displayed, hit **ENTER**.
The Phoenix counter offers the ability to enter up to fifteen (15) digits, the Tally 2001 exactly ten (10) digits. In the Phoenix, the remaining 5 digits must be coded as blanks.

SITE: _____

(use exactly 10 characters)

2. The next two (2) displays show: "**INFO: _____**". To enter any information on this line is optional (this means that entering further information is not required for the FDOT software, but if the collecting agency desires some specific informational code, enter it here). Both of the two displays have to be confirmed by pressing **ENTER**.
3. The display should now show: "SET THE **CURRENT TIME**: 00:10:15". Punch in the current time in *Military Format* beginning with hour, minute and second, then press **ENTER**.
4. The following display asks for the current date: "SET THE **CURRENT DATE**: 01/01/94". Punch in the current date in *MM/DD/YY-Format*, then press **ENTER**.
5. When the following display appears: "SET **CURRENT DAY OF WEEK?** SUN", use the Arrow Keys to scroll through the menu and press **ENTER** when the current day is selected.
6. The next display should show the maximum amount of available lanes for this type of count:

Select 1 2 3 4 5 6 7 8

Lanes: n n n n n n n n

7. Press the **number** on the keypad which corresponds to the lanes to be enabled. The following display shows lane 1 and 2 as an example; after the selection is made, press **ENTER**:

Select 1 2 3 4 5 6 7 8
Lanes: y y n n n n n n

The following displays may be repeated depending on the number of lanes being counted.

8. The first display offers further information about the first lane: "**INFO FOR LANE #1** _____". Up to ten digits (fifteen digits for the Phoenix counters) of information is possible, but for the Florida DOT Software it is not necessary to enter anything in this field. After completion press **ENTER**.
9. The next display should show: "**SELECT LANE #1 SENSOR: AXLE**". The selection of inductive loops (called Pres for Presence) is only possible when a loop board is installed in the counter. Use the ARROW KEYS to scroll through the menu choices (Axle or Pres [Loops]) and press **ENTER**.
10. The display should now show: "**SELECT LANE #N MODE: NORMAL**". The available choices depends on the connected type of sensor. If Axle, a choice has to be made between Normal, Direction or Subtract, if Pres (inductive loop), the choices are Normal and Direction.
- Direction is not used within the Florida DOT software.
 - Subtract is used when the count includes more than one (1) lane. For example when counting a two lane street using one long tube for the outer lane and one short tube for the inner lane. Then the count for the outer lane also contains the count for the inner lane, because vehicles using the inner lane must drive over the longer tube. Therefore, a subtraction must take place for the count of the outer lane to be a lane specific value.
 - Normal is used when one (1) lane is counted or when only the overall volume of a street is desired.

Choose the **appropriate mode** and then press **ENTER**.

Select Lane #n
Mode: Normal

11. If an **AXLE SENSOR** is selected, the following display appears: "**DIVIDE LANE #N COUNT BY 2: No**". Choose the **YES OPTION** by scrolling with the **ARROW KEYS** and confirm with **ENTER**. *If an Inductive Loop is selected, this display is not appear, instead the only the display described in step 12 will appear.*
12. The next display should begin to repeat with the displays of steps number 8 and 9, this will repeat based on the number of lanes as chosen in step number 7. Step number 10 will be repeated for every odd lane-number.
13. The next display should ask for the "**No. OF DIFFERENT INTERVALS: 1**". Press "**1**" and then **ENTER** to confirm a single interval.
14. The next display should show "**RECORD INTERVAL LENGTH: 00:15**". Type in **0,0,1,5** and press **ENTER** after doing so.

Record Interval	
Length	00:15

15. After the Record Interval has been entered, the counter will display a test mode. If any loops are connected, the display will show:

Tuning Loops

Nothing will be displayed, if only Axle Sensors are connected.

16. After a few seconds, the display will change automatically, either to give an error message (because one or more detectors are disconnected) In the example below, the loops are not connected, after connecting, press **ENTER** and the **TESTING MODE** will follow.

Unconnected Loop	
Check:	12

This display will also show a **TESTING MODE** display which changes whenever a vehicle passes a sensor if the sensors are connected properly.

Testing Lanes .. *			
1:	0	2:	0

To end the **TESTING MODE** display, press **ENTER**.

17. The next display should show "**SELECT MODE TO START? NOW**". Scroll through the menu selections by using the Arrow keys, select from the following, the appropriate response and confirm by pressing **ENTER**.

- Now
- Midnight
- Date/Time (in which case two other displays will follow to specific them)

18. The next display should show "**SELECT MODE TO STOP? NEVER**". Scroll through the menu by using the Arrow keys, select from the following, the appropriate response and confirm by pressing **ENTER**.

- Never
- 24 Hours
- Date/Time (in which case two other displays will follow to specify them)

19. The Last Display is as follows, and is answered by pressing **ENTER**.

-SETUP COMPLETE-

Press Enter Key

After completion of these 19 steps, the counter is prepared for volume counts.

3.5.3 Traffic Counter Set-Up for Classification Counts

To initiate the procedure to set-up the traffic counter for CLASSIFICATION COUNTS, the operator must verify that the **STORAGE MODE** is set to **BINNED MODE** (this has to be done in the CONFIGURATION, see section 3.6.2). Upon verification, select **Start Collecting** by scrolling through the menu using the Arrow Buttons (or by pressing **1**) from the first display after turning on the counter.

1. The site number (or **Identification number** as it is referred to by the counters from StreeterAmet or Mitron) must be manually enter for each count location. All counts performed for the Florida Department of Transportation require a number containing exactly **10 digits**: The first two (2) are the county code, the next four (4) are the station number, and the last four digits (4) are for the lane configuration code (**see Section 2**). Once the 10 digits are coded and displayed, hit **ENTER**.

The Phoenix counter offers the ability to enter up to fifteen (15) digits, the Tally 2001 exactly ten (10) digits. In the Phoenix, the remaining 5 digits must be coded as blanks.

SITE: _____

(use exactly 10 characters)

2. The next two (2) displays show: "**INFO:** _____". To enter any information on this line is optional (this means that entering further information is not required for the FDOT software, but if the collecting agency desires some specific informational code, enter it here). Both of the two displays have to be confirmed by pressing **ENTER**.
3. The display should now show: "SET THE **CURRENT TIME:** 00:10:15". Punch in the current time in *Military Format* beginning with hour, minute and second, then press **ENTER**.
4. The following display asks for the current date: "SET THE **CURRENT DATE:** 01/01/94". Punch in the current date in *MM/DD/YY-Format*, then press **ENTER**.
5. When the following display appears: "SET **CURRENT DAY OF WEEK?** SUN", use the Arrow Keys to scroll through the menu and press **ENTER** when the current day is selected.
6. The next display should show the maximum amount of available lanes for this type of count (a maximum of 4 lanes for classification counts):

Select 1 2 3 4

Lanes: n n n n

7. Press the number on the keypad which corresponds to the lanes to be enabled. The following display shows lane 1 and 2 as an example; after the selection is made, press **ENTER**:

Select 1 2 3 4

Lanes: y y n n

The following display may be repeated depending on the number of lanes selected.

8. The first display offers further information about the first lane: "**INFO FOR LANE #1** _____". Up to ten digits (fifteen digits for the Phoenix counters) of information is possible, but for the Florida DOT Software it is not necessary to enter anything in this field. After completion press **ENTER**.
9. The next display should show: "**DIRECTIONAL MODE FOR LANE #1:** No". The selection choices are Yes and No, choose **No** and press **ENTER**.

10. The display should show now: **"LANE #1 SENSOR > AXLE - AXLE"**. *This display will only be shown when at least one loop board is installed, otherwise the counter assumes Axle - Axle sensors and skips to the next step.* Choose from the following the **"Axle - Axle"** configuration (or as an **exception** the **"Pres - Axle - Pres"** configuration when using existing loops plus a road tube for a classification count) and then press **ENTER**.

- Axle - Axle
- Pres - Pres (Loop - Loop)
- Axle - Pres - Axle
- Pres - Axle - Pres

11. The next display asks for the distance between the sensors: **"LANE #1 SENSOR SPACING: 10.0"**. Enter the appropriate distance (e.g.: 100, the decimal is automatically entered for you) and confirm by pressing **ENTER**.

12. The next display will only appear when loops are installed: **"LOOP LENGTH FOR LANE #1: 6.0"**. Enter the appropriate length (e.g.: 60, the decimal is automatically entered for you)) and confirm by pressing **ENTER**.

Loop Length For

Lane #1: 6.0

13. The next display will repeat with the display of step numbers 8, 9, 10, 11. In the situation where loops are installed, step 12 will also be repeated. The number of times this sequence is repeated depends on the number of lanes chosen in step number 7.

14. The next seven displays ask for the type of bin the collected data should be stored in. Choose **"Collect Axle Bins: Yes"** from the following selection and confirm with **ENTER**.

- Axle Bin
- Speed Bin
- Gap Bin
- Headway Bin
- Length Bin
- Speed by Axle Bin
- Speed by Length Bin

15. The next display should show: "**Does Lanes 1 & 2 Overlap? No**". Overlap means any lane with two long and two short tubes crossing (e.g. a two lane classification count, one counter counting both lanes. Choose the **appropriate** response from the following selection and press **ENTER**.
- No used when no overlap
 - Same used when overlapping and lanes in the same direction (e.g. four lane two way highway and one counter on each curb)
 - Opposite used when overlapping and lanes in the opposite directions (e.g. two lane two way highway without median and one counter on one curb)
16. The next display will only appear when 4 Lanes are chosen in Step 7 and it is a repeat of Step 15. Answer appropriately and confirm by pressing **ENTER**.
17. If an AXLE SENSOR is selected, the following display appears: "**DIVIDE LANE #N COUNT BY 2: No**". Choose the **YES OPTION** by scrolling with the ARROW KEYS and confirm with ENTER. If an Inductive Loop is selected, this display is not appearing instead the following will appear (see Step 13)
18. The next display should ask for the "**NO. OF DIFFERENT INTERVALS: 1**". Press "**1**" and then **ENTER** to confirm a single interval.
19. The next display should show "**RECORD INTERVAL LENGTH: 00:15**". Type in **0,0,1,5** and press **ENTER** after doing so.

Record Interval	
Length	00:15

20. After the Record Interval is entered, the counter will display a TESTING MODE message. If loops are connected, the display will show:

Tuning Loops

The display will be blank if only Axle Sensors are connected.

21. After a few seconds the display will change automatically, to give an error message (because one or more detectors are disconnected) or show a testing mode. In the example below, loop 1 and 2 are not connected, after connecting press ENTER and the TESTING MODE will follow,

Unconnected Loop
Check: 12

If the connections are correct, the display will show a TESTING MODE which changes whenever a vehicle activates a sensor.

Testing Lanes .. *			
1:	0	2:	0

To end the TESTING MODE display, press **ENTER**.

22. The next display should show "**SELECT MODE TO START? NOW**". Scroll through the menu by using the Arrow keys, select from the appropriate option and confirm by pressing **ENTER**.

- Now
- Midnight
- Date/Time (in which case two other displays will follow to specify them)

23. The next display should show "**SELECT MODE TO STOP? NEVER**". Scroll by using the Arrow keys, select from the following the appropriate one and confirm that by pressing **ENTER**.

- Never
- 24 Hours
- Date/Time (in which case two other displays will follow to specify them)

24. The Last display is as follows and is answered by pressing **ENTER**.

-SETUP COMPLETE-
Press Enter Key

After completion of these 24 steps, the counter is prepared for classification counts.

3.6 OTHER EQUIPMENT

There are several other types of traffic counting equipment available for data collection. Every effort was made to get these vendors to supply equipment for testing and inclusion into this manual, but due to proprietary concerns these vendors chose not to participate. Should any other equipment be considered for use, prior approval must be obtained from the Florida Department of Transportation. The approval will be based on the units ability to provide compatible output formats that the data summary software can read.

Appendix A

FHWA TYPE F VEHICLE CLASSIFICATION SCHEME

1) **Motorcycles (Optional)** - All two or three-wheeled motorized vehicles. Typical vehicles in this category have saddle type seats and are steered by handle bars rather than a steering wheel. This category includes motorcycles, motor scooters, mopeds, motor powered bicycles, and three-wheeled motorcycles. This vehicle type may be reported at the option of the State.

2) **Passenger Cars** - All sedans, coupes, and station wagons manufactured primarily for the purpose of carrying passengers, including those passenger cars pulling recreational or other light trailers.

3) **Other Two Axle, Four Tire Single Unit Vehicles** - All two axle, four tire vehicles, other than passenger cars. Included in this classification are pick-ups, panels, vans, and other vehicles such as campers, motor homes, ambulances, hearses, and carryalls. Other two axle, four tire single unit vehicles pulling recreational or other light trailers are included in this classification.

4) **Buses** - All vehicles manufactured as traditional passenger carrying busses with two axles and six tires or three or more axles. This category includes only traditional buses (including school buses) functioning as passenger carrying vehicles. Modified busses should be considered to be a truck and be appropriately classified.

NOTE: In reporting information on trucks the following criteria should be used:

(a) Truck tractor units traveling without a trailer will be considered single unit trucks.

(b) A truck tractor unit pulling other such units in a "saddle mount" configuration will be considered as one single unit truck and will be defined only by the axles on the pulling unit.





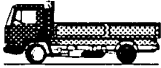
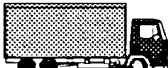







(c) Vehicles shall be defined by the number of axles in contact with the roadway. Therefore, "floating" axles are counted only when in the down position.

(d) The term "trailer" includes both semi- and full trailers.

5) **Two Axle, Six Tire, Single Unit Trucks** - All vehicles on a single frame including trucks, camping and recreation vehicles, motor homes, etc., having two axles and dual rear wheels.

6) **Three Axle Single Unit Trucks** - All vehicles on a single frame including trucks, camping and recreation vehicles, motor homes, etc., having three axles.

- 7) **Four Or More Axle Single Unit Trucks** - All trucks on a single frame with four or more axles.
- 8) **Four or Less Axle Single Trailer trucks** - All vehicles with four or less axles consisting of two units, one of which is a tractor or straight truck power unit.
- 9) **Five Axle Single Trailer Trucks** - All five axle vehicles consisting of two units, one of which is a tractor or straight truck power unit.
- 10) **Six or More Axle Multi-Trailer Trucks** - All vehicles with six or more axles consisting of two units, one of which is a tractor or straight truck power unit.
- 11) **Five or Less Axle Multi-Trailer Trucks** - All vehicles with five or less axles consisting of three or more units, one of which is a tractor or straight truck power unit.
- 12) **Six Axle Multi Trailer Trucks** - All six axle vehicles consisting of three or more units, one of which is a tractor or straight truck power unit.
- 13) **Seven or More Axle Multi Trailer trucks** - All vehicles with seven or more axles consisting of three or more units, one of which is a tractor or straight truck power unit.

1 Motorcycles 	2 Passenger Cars 	3 Two Axle, 4 Tire Single Unit 	4 Busses 
5 Two Axle, 6 Tire Single Unit 	6 Three Axle Single Units 	7 Four or More Axle Single Trailers 	8 Four or Less Axle Single Trailers 
9 Five Axle Single Trailers 	10 Six or More Axle Single Trailers 	11 Five or Less Axle Multi-Trailers 	
12 Six Axle Multi-Trailers 	13 Seven or More Axle Multi-Trailers 		

FHWA TYPE F VEHICLE CLASSIFICATION SCHEME IN AXLE DISTANCES (AS USED IN THE MITRON TRAFFIC COUNTERS)

TYPE	DESCRIPTION	AXLES 1-2	AXLES 2-3	AXLES 3-4	AXLES 4-5	AXLES 5-6	AXLES 6-7
F1	Motor.	0.1-6.0					
F2	Car	6.1-10.2					
F2	Car/w1 Axle Tire	6.1-10.2	6.0-18.0				
F2	Car/w2 Axle Trailer	6.1-10.2	6.0-18.0	0.1-6.0			
F3	Pickup/Van	10.3-13.0					
F3	Pickup/Van w/1A Trlr	10.3-13.0	6.0-18.0				
F3	Pickup/Van w/2A Trlr	10.3-13.0	6.0-18.0	0.1-6.0			
F4	Bus	20.0-40.0					
F4	Bus	20.0-40.0	0.1-6.0				
F5	2 Axle-Six tire	13.1-20.0					
F6	3 Axle-Single Unit	6.1-23.0	0.1-6.0				
F7	4 Axle- Single Unit	6.1-23.0	0.1-9.0	0.1-9.0			
F8	2S1	6.1-17.0	14.0-40.0				
F8	3S1	6.1-20.0	0.1-6.0	6.1-40.0			
F8	2S2	6.1-17.0	14.0-40.0	0.1-6.1			
F9	3S2	6.1-22.0	0.1-6.0	6.1-40.0	0.1-9.0		
F9	3 Axle w/Tire	6.1-22.0	0.1-6.0	6.1-23.0	1.1-23.0		
F10	6 Axle Single Tire	6.1-22.0	0.1-6.0	0.1-40.0	0.1-11.0	0.1-11.0	
F10	7 Axle Single Tire	6.1-22.0	0.1-6.0	0.1-40.0	0.1-13.0	0.1-13.0	0.1-13.0
F11	5 Axle-Multi Tire	6.1-17.0	11.1-25.0	6.1-18.0	11.1-25.0		
F12	6 Axle-Multi Tire	6.1-22.0	0.1-6.0	1.1-25.0	6.1-18.0	11.1-25.0	
F13	7 Axle-Multi Tire	0.1-40.0	0.1-40.0	0.1-40.0	0.1-40.0	0.1-40.0	0.1-40.0
F15	Unclassified Veh.						

All distances are in FEET

Appendix B: Set-Up Summary-Sheets

Table of Contents:

- 1.) StreeterAmet Traficomp III counters
 - a.) Model E-Z
 - b.) Model 241
- 2.) StreeterAmet Traficomp II, Model 141 plus Data Recorder 240
- 3.) MITRON MSC 3000
- 4.) Diamond Counters
 - a.) Tally 2001
 - b.) Phoenix

StreeterAmet Traficomp III Configuration and Set-up (Model E-Z)

CONFIGURATION

- | | |
|-------------------------------|--------------------------|
| 1. ENTER button to turn on | 11. EVEN PARITY = YES |
| 2. Config button | 12. 1 STOP BIT = YES |
| 3. USA DATE YES = ENTER | 13. TYPE EPSON = ENTER |
| 4. TIME HH:MM (MILITARY TIME) | 14. 24-Hour Total = YES |
| 5. Date MM-DD-YY | 15. Midnight Total = NO |
| 6. MODEM = NO | 16. Hour Total = YES |
| 7. COMM.ID 1 = ENTER | 17. Interval Total = YES |
| 8. Baud = 9600 | 18. Column Total = YES |
| 9. 7 Bits = Yes | 19. Grand Total = YES |
| 10. Parity = Yes | 20. FEET & MPH = ENTER |

SET-UP FOR VOLUME COUNTS

- | | |
|--|--|
| 1. Press SETUP button | 8. COLUMN = LANE |
| 2. ID = 10 digit Location Code (first 2 = county, second 4 = station number, third 4 = lane configuration) | 9. SUMMATE = NO |
| 3. STN = agency specific STATION NUMBER or Zero's | 10. RATIO = 2.00 |
| 4. INTERVAL 60 = change to 15 | 11. HEADING 2 = NONE |
| 5. PEAK INT. 1 = NO | 12. START NOW = NO |
| 6. NO. OF LANES = Number of Lanes (max = 8) | 13. START TIME (MILITARY TIME) |
| 7. LANE LAYOUT = I or <input type="checkbox"/> or I | 14. START DATE (MM-DD-YY) |
| I One axle sensor | 15. NEVER END = NO |
| <input type="checkbox"/> One loop | 16. END TIME (MILITARY TIME) |
| I I Two axle sensor | 17. END DATE (MM-DD-YY) |
| I <input type="checkbox"/> I Two axle sensors with loop in between | 18. ARMED = YES |
| <input type="checkbox"/> <input type="checkbox"/> Two loops | 19. Press VIEW to monitor setup, then press QUIT |
| <input type="checkbox"/> I <input type="checkbox"/> Two loops with one axle sensor | |
| I One road tube across two lanes and one across one lane (short tube first) | |

SET-UP FOR CLASSIFICATION COUNTS

- | | |
|--|--|
| 1. Press SETUP button | 10. COLUMN = Type |
| 2. ID = 10 digit Location Code (first 2 = county, second 4 = station number, third 4 = lane configuration) | 11. SUMMATE = NO |
| 3. STN = agency specific STATION NUMBER or Zero's | 12. HEADING 2 = NONE |
| 4. INTERVAL 60 = change to 15 | 13. START NOW = NO |
| 5. PEAK INT. 1 = NO | 14. START TIME (MILITARY TIME) |
| 6. NO. OF LANES = Number of Lanes (max = 4) | 15. START DATE (MM-DD-YY) |
| 7. LANE LAYOUT = I or <input type="checkbox"/> I <input type="checkbox"/> | 16. NEVER END = NO |
| I One axle sensor | 17. END TIME (MILITARY TIME) |
| <input type="checkbox"/> One loop | 18. END DATE (MM-DD-YY) |
| I I Two axle sensor | 19. ARMED = YES |
| I <input type="checkbox"/> I Two axle sensors with loop in between | 20. Press VIEW and select lane (UP/ DOWN ARROWS) |
| <input type="checkbox"/> <input type="checkbox"/> Two loops | 21. Press TEST |
| <input type="checkbox"/> I <input type="checkbox"/> Two loops with one axle sensor | 22. SENSOR DIST. = 10.0 (when Tubes), then ENTER |
| I One road tube across two lanes and one across one lane (short tube first) | 23. LOOP LENGTH = 6.0 (when Loops), then ENTER |
| 8. SAME LN DIR = Whatever is right (Yes or NO) | 24. More lanes to change? Go back to Step 20 |
| 9. 4 RT in Lane=NO (Yes when 4 Tubes, 2 lane Program) | 25. Press VIEW to monitor setup |
| | 26. Press QUIT |

StreeterAmet Traficomp III Configuration and Set-up (Model 241)

CONFIGURATION

- | | |
|-------------------------------|--------------------------|
| 1. ENTER button to turn on | 9. 24-Hour Total = YES |
| 2. Config button | 10. Hour Total = YES |
| 3. USA DATE YES = ENTER | 11. Interval Total = YES |
| 4. TIME HH:MM (MILITARY TIME) | 12. Column Total = YES |
| 5. Date MM-DD-YY | 13. FEET & MPH = ENTER |
| 6. MODEM = NO | |
| 7. Grand Total = YES | |
| 8. Midnight Total = NO | |

SET-UP FOR VOLUME COUNTS

- | | |
|--|--|
| 1. Press SETUP button | 10. COLUMN = LANE |
| 2. ID = 10 digit Location Code (first 2 = county, second 4 = station number, third 4 = lane configuration) | 11. SUMMATE = NO |
| 3. STN = agency specific STATION NUMBER or Zero's | 12. RATIO = 2.00 |
| 4. INTERVAL 60 = change to 15 | 13. HEADING 2 = NONE |
| 5. PEAK INT. 1 = NO | 14. START NOW = NO |
| 6. NO. OF LANES = Number of Lanes (max = 8) | 15. START TIME (MILITARY TIME) |
| 7. PIEZO NO= ENTER (WHEN BOARD IS INSTALLED) | 16. START DATE (MM-DD-YY) |
| 8. AUX CONTACT= I OR <input type="checkbox"/> | |
| 9. LANE LAYOUT = I or <input type="checkbox"/> or I | 17. NEVER END = NO |
| I One axle sensor | 18. END TIME (MILITARY TIME) |
| <input type="checkbox"/> One loop | 19. END DATE (MM-DD-YY) |
| I I Two axle sensor | 20. ARMED = YES |
| I <input type="checkbox"/> I Two axle sensors with loop in between | 21. Press VIEW to monitor setup, then press QUIT |
| <input type="checkbox"/> <input type="checkbox"/> Two loops | |
| <input type="checkbox"/> I <input type="checkbox"/> Two loops with one axle sensor | |
| I One road tube across two lanes and one across one lane (short tube first) | |

SET-UP FOR CLASSIFICATION COUNTS

- | | |
|--|---|
| 1. Press SETUP button | 10. COLUMN = Type |
| 2. ID = 10 digit Location Code (first 2 = county, second 4 = station number, third 4 = lane configuration) | 11. SAME Lane DiRection = Yes or NO (only with I I) |
| 3. STN = agency specific STATION NUMBER or Zero's | 12. 4 RT in Lane=NO (Yes, when 4 Tubes, 2 lane Program) |
| 4. INTERVAL 60 = change to 15 | 13. SUMMATE = NO |
| 5. PEAK INT. 1 = NO | 14. HEADING 2 = NONE |
| 6. NO. OF LANES = Number of Lanes (max = 4) | 15. START NOW = NO |
| 7. Piezo No = Enter | 16. START TIME (MILITARY TIME) |
| 8. Aux Contact = I or <input type="checkbox"/> | 17. START DATE (MM-DD-YY) |
| 9. LANE LAYOUT = I I or <input type="checkbox"/> I <input type="checkbox"/> | 18. NEVER END = NO |
| I One axle sensor | 19. END TIME (MILITARY TIME) |
| <input type="checkbox"/> One loop | 20. END DATE (MM-DD-YY) |
| I I Two axle sensor | 21. ARMED = YES |
| I <input type="checkbox"/> I Two axle sensors with loop in between | 22. Press VIEW and select lane (UP/ DOWN ARROWS) |
| <input type="checkbox"/> <input type="checkbox"/> Two loops | 23. Press TEST |
| <input type="checkbox"/> I <input type="checkbox"/> Two loops with one axle sensor | 24. SFNSOR DIST. = 10.0 (when Tubes), then ENTER |
| I One road tube across two lanes and one across one lane (short tube first) | 25. LOOP LENGTH = 6.0 (when Loops), then ENTER |
| | 26. More lanes to change? Go back to Step 20 |
| | 27. Press VIEW to monitor setup |
| | 28. Press QUIT |

StreeterAmet Traficomp II Configuration and Set-up
(Model 141 [Field Recorder] plus the 240 Data Collector)

FAST SETUP BY USING THE SPECIAL FUNCTION KEYS

VOLUME COUNTS = A-button, just change STATION NUMBER and ID NUMBER and YES to question "CLEAR 141 DATA".

CLASSIFICATION COUNTS = B-button, just change STATION NUMBER and ID NUMBER and YES to question "CLEAR 141 DATA".

CONFIGURATION

- | | |
|--|------------------------------|
| 1. Config/Test button = Yes | 6. EVEN PARITY = YES |
| 2. Minute, Hour, Day, Month and Year (MILITARY TIME) | 7. 1 STOP BIT = YES |
| 3. Baud = 9600 | 8. COLLECT AUTO.; CLEAR = NO |
| 4. 7 Bits = Yes | 9. Choose output FORMAT = 11 |
| 5. Parity = Yes | 10. CONFIG; ERASE DATA = YES |

SET-UP FOR VOLUME COUNTS

- | | |
|---|---|
| 1. Press PROGRAM button | 10. VOLUME; LOOPS YES <u>NO</u> = ENTER WHEN NO |
| 2. PROGRAM 141; VOLUME <u> </u> = ENTER | 11. INP. PER CHAN. <u> </u> = 1 |
| 3. PROGRAM 141; 1213 <u> </u> = NOTHING | 12. NO. OF LANES = Number of Lanes (max = 4) |
| 4. PROGRAM 141; OK = NOTHING | 13. SAVE SETUP; YES NO = YES |
| 5. Press SETUP button | 14. SAVE SETUP; ASSIGN: ABCD = A |
| 6. VOLUME; BUSY <u> </u> = NOTHING | 15. SAVE SETUP; BUSY <u> </u> = NOTHING |
| 7. VOLUME; STATION <u> </u> = agency specific STATION NUMBER or Zero's | 16. CLEAR 141 DATA; YES <u>NO</u> = YES |
| 8. VOLUME; ID CODE <u> </u> = 10 digit Location Code (first 2 = county, second 4 = station number, third 4 = lane configuration) | 17. Press VIEW |
| 9. VOLUME; INTERVAL 60 = change to 15 | 18. Press QUIT |

SET-UP FOR CLASSIFICATION COUNTS

- | | |
|---|---|
| 1. Press PROGRAM button | 9. VEHICLE TYPE; INTERVAL 60 = change to 15 |
| 2. PROGRAM 141; VEHICLE TYPE <u> </u> = ENTER | 10. SAVE SETUP; YES NO = YES |
| 3. PROGRAM 141; 2141 <u> </u> = NOTHING | 11. SAVE SETUP; ASSIGN: ABCD = B |
| 4. PROGRAM 141; OK = NOTHING | 12. SAVE SETUP; BUSY <u> </u> = NOTHING |
| 5. Press SETUP button | 13. CLEAR 141 DATA; YES <u>NO</u> = YES |
| 6. VEHICLE TYPE; BUSY <u> </u> = NOTHING | 14. Press VIEW |
| 7. VEHICLE TYPE; STATION <u> </u> = agency specific STATION NUMBER or Zero's | 15. Press QUIT |
| 8. VEHICLE TYPE; ID CODE <u> </u> = 10 digit Location Code (first 2 = county, second 4 = station number, third 4 = lane configuration) | |

MITRON MSC 3000 Configuration and Set-up

SET-UP FOR VOLUME COUNTS

1. TEST button, then GOOD appears
2. TEST button
3. S V or C = 2
4. TEST button
5. L or H = 1 for Loops, 2 for Tubes
6. 1 or 2 = 1 for Channel 1
7. Press CAN Button
CH:1 = ENTER
8. underbar LC = 10 digit Location Code (first 2 = county, second 4 = station number, third 4 = lane configuration)
9. underbar Date = MM-DD-YY
10. underbar RE-T = real time (*MILITARY TIME*)
11. underbar ST-T = start time (*MILITARY TIME & WHOLE HOURS*)
12. underbar SA-T = 0015 (interval)
13. Overbar "+ " = 2
14. Overbar SUM / MID = ENTER
15. Overbar 2-W / INC = ENTER
16. OPR (OPeRator) = number of operator
17. MA# (Machine-number).
18. Press CAN Button
19. REC-button
20. MONT-button to view Setup
21. CAN-button

SET-UP FOR CLASSIFICATION COUNTS

1. TEST button, then GOOD appears
2. TEST button
3. S V or C = 3
4. TEST button
5. FAR = 305 (for 10 feet)
6. F:00 = press CAN Button
7. underbar LC = 10 digit Location Code (first 2 = county, second 4 = station number, third 4 = lane configuration)
8. underbar Date = MM-DD-YY
9. underbar RE-T = real time (*MILITARY TIME*)
10. underbar ST-T = start time (*MILITARY TIME & WHOLE HOURS*)
11. underbar SA-T = 0015 (interval)
12. OPR (OPeRator) = no of operator
13. MA# (Machine-number).
14. REC-button
15. MONT-button twice to view classes when crossing the tubes
16. CAN-button

Diamond Tally 2001 Configuration and Set-up

CONFIGURATION

1. Switch POWER button to on position
2. SELECT OPTION: -> 6 = Configure System
3. ENTER
4. Storage Mode: COUNT for Volume
BINNED for Classification
5. Format of Dates: MM/DD/YY
6. ERASE FIRST FILE WHEN NO MEM = NO
7. VERIFY POWER OFF OPTION: Enabled
8. CREATE NEW FILES WHEN: Daily
9. MAXIMUM BAUD FOR MODEM = 9600
11. Only for *Binned Mode for Classification Counts*:
11a.) Speed and Length Format: U.S.
11b.) SnMis Storage Mode: View Only
11c.) Maximum Axle Spacing: 35.0'
12. SELECT OPTION: Configure System : Press 1 = Start Collecting to go to the Set-up

SET-UP FOR VOLUME COUNTS

1. CONFIGURATION: COUNT MODE!
2. SELECT OPTION: Configure System : Press 1 = Start Collecting to go to the Set-up
3. ID = 10 digit Location Code (first 2 = county, next 4 = station number, last 4 = lane configuration)
4. INFO = agency specific FIRST NUMBER or Zero's
5. INFO = agency specific SECOND NUMBER or Zero's
6. Set The Current Time (MILITARY TIME)
7. Set The Current Date (MM/DD/YY)
8. Set The Current Day of Week?
9. Select Lanes: 12345678
10. Info for Lane #1: agency specific 10 digits
11. Select Lane #1 Sensor: Axle or Pres (Skipped when no Loop board has been installed)
12. Select Lane #1 Mode:
Normal, when one lane counted or all in one input
Subtract, when 2 or more lanes counted in separate inputs
13. If AXLE is selected or if no Loop board installed:
Divide Lane # 1 Count by 2: YES
14. Repeating of Step 10, 11 and 13 as often as selected number of lanes
15. Repeating of Step 12 for every ODD lane number
16. No. Of Different Intervals = 1
17. Record Interval Length = 00.15
18. Select Mode to Start? NOW or MIDNIGHT or DATE/TIME (MILITARY TIME)
19. Select Mode to Stop? Never or 24 Hours or Date/Time (Military Time)
20. SETUP COMPLETE ==> Enter

SET-UP FOR CLASSIFICATION COUNTS

1. CONFIGURATION: BINNED MODE!
2. SELECT OPTION: Configure System : Press 1 = Start Collecting to go to the Set-up
3. ID = 10 digit Location Code (first 2 = county, next 4 = station number, last 4 = lane configuration)
4. INFO = agency specific FIRST NUMBER or Zero's
5. INFO = agency specific SECOND NUMBER or Zero's
6. Set The Current Time (MILITARY TIME)
7. Set The Current Date (MM/DD/YY)
8. Set The Current Day of Week?
9. Select Lanes: 1234
10. Info for Lane #1: agency specific 10 digits
11. Directional Mode for Lane #1: NO
12. Lane #1 Sensor: Axle-Axle or Pres-Axle-Pres (Pres-Axle-Pres only with Loop board)
13. Lane #1 Sensor Spacing= 10.0
14. Only when loops are installed perform step 15
15. Loop Length for Lane #1= 6.0
16. REPEATING OF STEP 10, 11, 12, 13 AND 14 AS OFTEN AS SELECTED NUMBER OF LANES
17. Collect Axle Bins= YES
18. Collect Speed Bins= No
19. Collect Gap Bins= No
20. Collect Headway Bins= No
21. Collect Length Bins= No
22. Collect Speed by Axle Bins= No
23. Collect Speed by Length Bins= No
24. Does Lanes 1 & 2 Overlap? NO or SAME or OPPOSIT
25. Does Lanes 3 & 4 Overlap? (When existing!)
26. No. Of Different Intervals = 1
27. Record Interval Length = 00.15
28. Select Mode to Start? NOW or MIDNIGHT or DATE/TIME (MILITARY TIME)
29. Select Mode to Stop? NEVER or 24 HOURS or DATE/TIME (Military Time)
30. SETUP COMPLETE ==> Enter

Diamond Phoenix Configuration and Set-up**CONFIGURATION**

1. Switch POWER button to on position
2. SELECT OPTION: -> 6 = Configure System
3. ENTER
4. Storage Mode: COUNT for Volume
BINNED for Classification
5. Format of Dates: MM/DD/YY
6. ERASE FIRST FILE WHEN NO MEM = NO
7. VERIFY POWER OFF OPTION: Enabled
8. CREATE NEW FILES WHEN: Daily
9. MAXIMUM BAUD FOR MODEM = 9600
11. Only for *Binned Mode for Classification Counts*:
11a.) Speed and Length Format: U.S.
11b.) SnMis Storage Mode: View Only
11c.) Maximum Axle Spacing: 35.0'
12. SELECT OPTION: Configure System : Press 1 = Start Collecting to go to the Set-up

SET-UP FOR VOLUME COUNTS

1. CONFIGURATION: COUNT MODE!
2. SELECT OPTION: Configure System : Press 1 = Start Collecting to go to the Set-up
3. ID = 10 digit Location Code (first 2 = county, next 4 = station number, last 4 = lane configuration)
4. INFO = agency specific FIRST NUMBER or Zero's
5. INFO = agency specific SECOND NUMBER or Zero's
6. Set The Current Time (MILITARY TIME)
7. Set The Current Date (MM/DD/YY)
8. Set The Current Day of Week?
9. Select Lanes: 12345678
10. Info for Lane #1: agency specific 15 digits
11. Select Lane #1 Sensor: Axle or Pres (Skipped when no Loop board installed)
12. Select Lane #1 Mode:
Normal, when one lane counted or all in one input
Subtract, when 2 or more lanes counted in separate inputs
13. If AXLE is selected or if no Loop board installed:
Divide Lane # 1 Count by 2: YES
14. Repeating of Step 10, 11 and 13 as often as selected number of lanes
15. Repeating of Step 12 for every ODD lane number
16. No. Of Different Intervals = 1
17. Record Interval Length = 00.15
18. Select Mode to Start? NOW or MIDNIGHT or DATE/TIME (MILITARY TIME)
19. Select Mode to Stop? Never or 24 Hours or Date/Time (Military Time)
20. SETUP COMPLETE ==> Enter

SET-UP FOR CLASSIFICATION COUNTS

1. CONFIGURATION: BINNED MODE!
2. SELECT OPTION: Configure System : Press 1 = Start Collecting to go to the Set-up
3. ID = 10 digit Location Code (first 2 = county, next 4 = station number, last 4 = lane configuration)
4. INFO = agency specific FIRST NUMBER or Zero's
5. INFO = agency specific SECOND NUMBER or Zero's
6. Set The Current Time (MILITARY TIME)
7. Set The Current Date (MM/DD/YY)
8. Set The Current Day of Week?
9. Select Lanes: 1234
10. Info for Lane #1: agency specific 15 digits
11. Directional Mode for Lane #1: NO
12. Lane #1 Sensor: Axle-Axle or Pres-Axle-Pres (Pres-Axle-Pres only with Loop board)
13. Lane #1 Sensor Spacing= 10.0
14. Only when loops are installed, perform step 15
15. Loop Length for Lane #1= 6.0
16. REPEATING OF STEP 10, 11, 12, 13 AND 14 AS OFTEN AS SELECTED NUMBER OF LANES
17. Collect Axle Bins= YES
18. Collect Speed Bins= No
19. Collect Gap Bins= No
20. Collect Headway Bins= No
21. Collect Length Bins= No
22. Collect Speed by Axle Bins= No
23. Collect Speed by Length Bins= No
24. Does Lanes 1 & 2 Overlap? NO or SAME or OPPOSIT
25. Does Lanes 3 & 4 Overlap? (When existing!)
26. No. Of Different Intervals = 1
27. Record Interval Length = 00.15
28. Select Mode to Start? NOW or MIDNIGHT or DATE/TIME (MILITARY TIME)
29. Select Mode to Stop? NEVER or 24 HOURS or DATE/TIME (Military Time)
30. SETUP COMPLETE ==> Enter

Appendix C

INCH TO CENTIMETER CONVERSION CHART

Inches	Feet & Inches	Centimeters	Inches	Feet & Inches	Centimeters
48	4 0	122	160	13 4	406
51	4 3	130	164	13 8	417
54	4 6	137	167	13 11	424
57	4 9	145	170	14 2	432
60	5 0	152	173	14 5	439
63	5 3	160	176	14 8	447
66	5 6	168	179	14 11	455
69	5 9	175	182	15 2	462
72	6 0	183	185	15 5	470
75	6 3	191	188	15 8	478
78	6 6	198	191	15 11	485
81	6 9	206	194	16 2	493
84	7 0	213	197	16 5	500
87	7 3	221	200	16 8	508
90	7 6	229	203	16 11	516
93	7 9	236	206	17 2	523
96	8 0	244	209	17 5	531
99	8 3	251	212	17 8	538
102	8 6	259	215	17 11	546
105	8 9	267	218	18 2	554
108	9 0	274	221	18 5	561
111	9 3	282	224	18 8	569
114	9 6	290	227	18 11	577
117	9 9	297	230	19 2	584
120	10 0	305	233	19 5	592
123	10 3	312	236	19 8	599
126	10 6	320	239	19 11	607
129	10 9	328	242	20 2	615
132	11 0	335	245	20 5	622
135	11 3	343	248	20 8	630
138	11 6	351	251	20 11	638
141	11 9	358	254	21 2	645
144	12 0	366	257	21 5	653
147	12 3	373	260	21 8	660
150	12 6	381	263	21 11	668
153	12 9	389	266	22 2	676
156	13 0	396	269	22 5	683
159	13 3	404	272	22 8	691
162	13 6	411	275	22 11	699
165	13 9	419	278	23 2	706

FORMULA: $\text{Inches} \times 2.54 = \text{Centimeters}$

Appendix D: Glossary

Abbreviations

AADT	Annual Average Daily Traffic
AADW	Annual Average Days of the Week
AADWDT	Annual Average Weekday Traffic
AAWET	Annual Average Weekend Traffic
ADT	Average Daily Traffic
ATR	Automatic Traffic Recorder
AVC	Automatic Vehicle Classifier
AVMT	Annual Vehicle Miles Traveled
DEAL	Design Equivalent Axle Load
DHV	Design Hour Volume
DVMT	Daily Vehicle Miles Traveled
ESAL	Equivalent Single Axle Load
FARS	Fatal Accident Reporting System
IVHS	Intelligent Vehicle/Highway Systems
LTPP	Long-Term Pavement Performance
MADT	Monthly Average Daily Traffic
MADW	Monthly Average Days of the Week
MAWDT	Monthly Average Weekday Traffic
MAWET	Monthly Average Weekend Traffic
SHRP	Strategic Highway Research Program
VMT	Vehicle Miles Traveled
WIM	Weigh-in-Motion

Definitions

ADJUSTED COUNT

An estimate of a traffic statistic calculated from a base traffic count that has been adjusted by application of axle, seasonal, or other defined factors.

ANNUAL AVERAGE DAILY TRAFFIC (AADT)

The estimate of typical daily traffic on a road segment for all days of the week, Sunday through Saturday, over the period of one year.

ANNUAL AVERAGE DAYS OF THE WEEK

The estimate of typical traffic volume mean statistic for each day of the week, over the period of one year, and calculated from permanent counter data from the sum of Monthly Average Days of the Week (MADWs) for a year divided by the number of (MADWs).

ANNUAL AVERAGE WEEKDAY TRAFFIC (AAWDT)

The estimate of typical traffic over the period of one year, for the days Monday through Friday, calculated from permanent counter data as the sum of Monthly Average Weekday Traffic (MAWDTs) divided by the number of MAWDTs. Friday traffic may be excluded from AAWDT calculation and included in AAWET calculation if these data more closely approximate weekend traffic characteristics.

ANNUAL AVERAGE WEEKEND TRAFFIC (AAWET)

The estimate of typical daily traffic over the period of one year, for the days Saturday through Sunday, calculated for permanent counter data as the sum of Monthly Average Weekday Traffic (MAWETs) divided by the number of MAWETs. Friday traffic may be included in AAWDT calculation if the inclusion of these data does not increase the AAWET coefficient of variation.

ANNUAL VEHICLE MILES TRAVELED (AVMT)

Total annual traffic on a road segment, expressed as AADT multiplied by the number of days in the year, multiplied by the road segment.

AVERAGE DAILY TRAFFIC (ADT)

The total traffic volume during a given time period (more than a day and less than a year) divided by the number of days in that period.

AUTOMATIC TRAFFIC RECORDER (ATR)

A device that records a continuous passage of vehicles across a given section of roadway by hours of the day, days of the week or months of the year.

AUTOMATIC TRAFFIC RECORDER (ATR) COUNTS

Base traffic counts recorded at an automatic traffic recorder.

AUTOMATIC VEHICLE CLASSIFIER (AVC)

A device that works in conjunction with computerized electronic equipment that counts and classifies vehicles by type and axle configuration.

AXLE CORRECTION FACTOR

The factor developed to adjust vehicle axle sensor base data for the incidence of vehicles with more than two axles, or the estimate of total axles based on automatic vehicle classification data divided by the total number of vehicles counted.

BASE COUNT

A traffic count that has not been adjusted for axle factors (effects of trucks) or seasonal (day-of-the-week/month-of-the-year) effects.

BASE DATA

The unedited and unadjusted measurements of traffic volume, vehicle classification, and vehicle or axle weight.

CLEAN AIR ACT AMENDMENTS OF 1990

Legislation authorizing the Environmental Protection Agency (EPA) to establish and implement rules, which among other topics concerns mobile pollutant emission sources which affect air quality.

COUNT

The data collected as a result of measuring and recording traffic characteristics such as vehicle volume, classification, speed, weight, or a combination of these characteristics.

COUNT PERIOD

The beginning and ending date and time of traffic characteristic measurement.

COVERAGE COUNT

A traffic count taken as a requirement for system level estimates of traffic. The count is typically short term, and may be volume, classification, or weight in Motion.

DAILY VEHICLE MILES TRAVELED (DVMT)

Annual Average Daily Traffic on a road segment, expressed as AADT, multiplied by the length of the road segment

DATA OBSOLESCENCE COUNT

A traffic count taken to assure the state road system has been counted within a defined count cycle. The count base is recommended as three years.

DESIGN EQUIVALENT AXLE LOAD (DEAL)

The cumulative loadings the proposed pavement will experience during its design period, expressed as the total number of equivalent 80 kN (18,000 pound) single axle load applications.

DESIGN HOURLY VOLUME (DHV)

The hourly traffic volume used in the design of highways, usually represented by the 30th highest hourly volume of the future year chosen by design.

DESIGN PERIOD

The number of years from the initial application of traffic until the first planned major resurfacing or overlay.

DIURNAL DISTRIBUTION

Periodic distribution of traffic characteristics during a one day period. The period may vary, but is commonly either in 15 minute or one hour increments. The daily distribution may be for vehicle volume, classification, or gross vehicle weight.

ELECTRICAL CONTACT DETECTORS (TAPE SWITCH)

Consists of a pair of steel strips that are contained in a rubber pad or strip which is placed on the roadway surface. The weight of a moving vehicle brings the steel strips into contact, thereby causing an electric current to flow, which triggers the recording device.

EQUIVALENT SINGLE AXLE LOAD (ESAL)

A unit of measurement equating the amount of pavement consumption caused by an axle or group of axles, based on the loaded weight of the axle group, to the consumption caused by a single axle weighing 18,000 lbs.

FATAL ACCIDENT REPORTING SYSTEM (FARS)

National database which utilizes state reporting to gather and report data on accidents which result in the loss of human life.

FUNCTIONAL CATEGORY

A type of roadway defined by the type of traffic service provided.

FUNCTIONAL CLASSIFICATION

The grouping of streets and highways into classes, or systems, according to the character of service they are to provide. The recognition that individual roads do not serve travel independently and most travel involves movement through a network of roads is basic to functional classification.

INFRARED/ULTRASONIC DEVICES

A infrared device which uses a pickup cell, similar to a photo-electric cell, but sensitive to infrared (heat) radiation rather than light. The ultrasonic device uses differing sound frequencies to record the passage of vehicles.

INTELLIGENT VEHICLE HIGHWAY SYSTEM (IVHS)

The application of electronic, computer and communication technology to add efficiency to motor vehicle use and capacity to existing roadways. IVHS research and development may enhance vehicle sensing and recording devices.

INTERSECTION COUNTS

Traffic counts taken at an intersection, either manually or with counters, to study the flow of vehicles through an intersection. Generally, straight movements are recorded with counters, and turning movements are either taken manually or in combination with counters.

LONG-TERM PAVEMENT PERFORMANCE (LTPP)

One of the four research areas of the Strategic Highway Research program. This pavement research is designed as a 20-year program and requires traffic data collection throughout that period.

LOOP DETECTOR

A detector that senses a change in inductance, of it's inductive loop sensor, caused by the passage or presence of a vehicle near the sensor.

MAGNETIC DETECTORS

A detector that senses changes in the earth's magnetic field caused by the movement of a vehicle near its sensors.

MANUAL COUNTS

Measurements of traffic characteristics based on human observation, which may or may not be electronically recorded.

MECHANICAL COUNT

Measurement of traffic characteristics by sensors and electronic recording of the measurements, independent of human observations.

MINIMUM TIME INTERVALS

The period in which traffic data should be aggregated. In urban areas, the minimum interval is 15 minutes, indicating data may be aggregated in periods of 15 minutes or less. In rural areas, the minimum time area is 60 minutes, indicating data may be aggregated in one hour or less.

MONTHLY AVERAGE DAILY TRAFFIC (MADT)

The estimate of mean traffic data for a month, calculated by the sum of Monthly Average Days of the Week (MADWs) divided by seven; or in the absence of a MADW for each day of the week, divided by the number MADWs by the month.

MONTHLY AVERAGE DAYS OF THE WEEK (MADWs)

The estimate of traffic volume mean statistic for each day of the week, over the period of one month. It is calculated from edited-accepted counter data as the sum of all traffic for each day of the week (Sunday, Monday and so forth through the week) during the month, divided by the occurrences of that day during that month.

MONTHLY AVERAGE WEEKDAY TRAFFIC (MAWDT)

The estimate of the five day average of traffic for the period Monday through Friday in each month, calculated as the sum of MADWs for Monday through Friday, divided by five. Friday traffic may be excluded from MAWDT calculation if these data more closely approximate weekend (MAWET) than weekday traffic.

MONTHLY AVERAGE WEEKEND TRAFFIC (MAWET)

The estimate of a two day average of traffic for the period Saturday through Sunday in each month, calculated by the sum of MADWs for Saturday through Sunday divided by the number of MADWs for Saturday through Sunday during the month. Friday traffic may be included in MAWET calculation if these data more closely approximate weekend than weekday (MAWDT) traffic. If Friday traffic is included, MAWET is the three day average of traffic for the period Friday through Sunday in each month, calculated as the sum of MADWs for Friday through Sunday, divided by three.

NESTED TRAFFIC COUNTS

Traffic monitoring activities that record more than one traffic characteristic, such as volume or vehicle classification or volume, vehicle classification and weight. Nested counts may also refer to use of two or more devices to record the same or different traffic characteristics at the same time.

OPPORTUNITY COST

The cost of not funding an alternative program or project when limited resources are expended by selecting one among competing needs. This concept is helpful in quantifying the impact when resources are not expended on the program or project of greatest cost/benefit.

OVERDESIGN

The difference of costs in a project based on incorrect information, minus costs based on correct information.

PEAK HOUR

A sixty minute interval that contains the largest volume of traffic for a specific day or "average" day.

PEAK HOUR FACTOR

A measure of demand, which is a fraction of the 24 hour daily volume of traffic, occurring during the highest volume 60 minute period of the day.

PEAK HOUR PEAK DIRECTION

The direction of travel (during the 60-minute peak hour) that contains the highest percentage of travel.

PEAK PERIOD

The highest period of traffic flow during the AM and PM time periods.

PERMANENT COUNT SOLUTIONS

ATRs that are permanently placed at specific locations throughout the regions to record the distribution and variation of traffic flow by hours of the day, days of the week, and months of the year from year to year.

PHOTO - ELECTRIC SENSORS

A source of light (which emits a beam) placed at one side of the road and a photocell placed at the other. The passage of a vehicle obstructs the light beam and causes detection by the photocell.

PNEUMATIC ROAD TUBE COUNTERS

Flexible rubber tube at right angles to traffic and connected to a recording unit device, used to detect the passage of vehicle axles.

POLLING

Automated transfer of traffic measurements from permanent counters to a computer for editing and summarization.

PRESENCE DETECTOR

A detector that senses a change in inductance caused by the presence of a vehicle. The most common example of a presence detector is an inductive loop.

PROJECT RELATED COUNT

A traffic count taken to support a roadway or bridge project.

RELIABILITY FACTOR

In the AASHTO Pavement Design Guide, the factor multiplied by Design Equivalent Single Axle Loads to Account for Variability in Traffic and non-traffic data.

ROAD SECTION

Unit of roadway, termini of which are typically defined in relation to a request for traffic characteristics. A road section may consist of more than one road segment.

ROAD SEGMENT

Unit of roadway, the termini of which are defined by various methods among state agencies. Termini may be defined by change in pavement type, structural number, condition rating, or political boundary. Traffic characteristics may be used to define unique road segments.

SEASONAL FACTORS

Parameters used to adjust base counts which consider travel behavior fluctuations by day of the week and month of the year.

SPECIAL COUNT

A traffic count taken to respond to a request for traffic information, not included as part of the coverage or project-related count plan.

SPECIAL PURPOSE COUNT

A traffic count taken for the specific purpose for better understanding traffic-flow characteristics at predetermined sections of the roadway. These may include studying the effects of traffic accidents, roadway closures or traffic re-routing.

STRATEGIC HIGHWAY RESEARCH PROGRAM (SHRP)

A five year program for pavement and operations research funded by Congress and managed through the National Academy of Sciences. One of the four research areas, Long Term Pavement Performance, is planned as a 20 year program. This program will be continued by the Federal Highway Administration beginning in 1992.

THIRTIETH HIGHEST HOUR (30TH HIGHEST HOUR)

For all edit-accepted hours of data during a one-year period, the 30th highest hourly traffic volume. This volume is commonly used as a representative hour of traffic volume in roadway design.

TRAFFIC PROGRAM

The collection, editing, summarization, reporting, and analysis of traffic volume, classification and weight data.

TRUCKS

A heavy vehicle engaged primarily in the transport of goods and materials, or in the delivery of services other than public transportation. A heavy truck is a single unit truck with gross vehicle weight (GVW) greater than 26,000 lbs; or, tractor trailer combinations; or truck with cargo trailers, or truck tractor pulling no trailer. A medium truck is any single unit truck with GVW between 10,000 and 26,000 lbs. A light truck is a truck under 10,000 lbs.

UNCERTAINTY

All data collection, summarization, and reported results have an associated uncertainty. There are three types of uncertainty: completeness, modeling and parameter.

Completeness

Uncertainty in the data reports may be introduced by the following examples of the category of uncertainty - "completeness": human errors, common cause failures, physical processes, and accident sequences.

Modeling

Uncertainty in data reports may be introduced by mathematical or numerical approximations which are made for convenience.

Parameters

Uncertainty in data reports may be introduced by the following examples of parameter uncertainty: incomplete or biased data, data which are generic as opposed to site specific, and the validity of the method data analysis.

UNDERDESIGN

Cost of developing an additional road project to make a design adequate, such as addition of surfacing.

VEHICLE CLASSIFICATION

The measurement, summarization and reporting of traffic volume by vehicle type and axle configuration.

VEHICLE MILES TRAVELED (VMT)

Average Sunday through Saturday vehicle movement on a specific road segment multiplied by the length of the road segment, reported in the form of daily and annual VMT.

WEIGHT IN MOTION (WIM)

The process of estimating a moving vehicle's static gross weight and the portion of that weight that is carried by each wheel, axle, or axle group or combination thereof, by measurement and analysis of dynamic forces applied by its tires to a measuring device.